부록. 표 1 해석 타입(Study Types)

Study	설명		
	Stationary Studies		
Stationary	정상상태 해석. 모든 시간 도함수는 무시. 정적 PDE 문제를 지닌 최적화 문제에도 적용가능.		
	Time-Dependent Studies		
Time Dependent	매 시간마다 계산을 하는 시간 의존 또는 과도해석. 시변 PDE 문제의 최적화에서도 사용.		
Time Discrete	시간 해석 시, 이산화 과정을 다룬 문제를 풀고자 할 때 사용함. prev()나 bdf() 함수를 사용할 수 있음.		
Frequency to Time FFT	Time Dependent 해석에서 주파수 영역을 시간 영역으로 변경하는 FFT 수행.		
	Eigenfrequency Studies		
Eigenfrequency	고유진동수 계산.		
Eigenvalue	고유치 계산.		
Stationary Then Eigenfrequency	Eigenvalue 솔버를 사용하기 전에, 최적화에 대해 Stationary 솔버를 사용.		
	Frequency Domain Studies		
Frequency Domain	주파수 영역 해석.		
Frequency-Domain Perturbation	바이어스 솔루션에 대한 작은 진동 연구.		
Time to Frequency FFT	Frequency Domain 해석에서 시간영역을 주파수영역으로 변경하는 FFT 수행.		
	해석 확장		
Batch	Show More Options > Batch (또는 Batch and Cluster) 체크 시 사용 가능. 지정된 해석을 기반으로 batch 해석 수행.		
Batch Sweep	Show More Options > Batch (또는 Batch and Cluster) 체크 시 사용 가능. 관심 매개변수별로 지정된 해석을 통해 batch 해석을 수행.		
Cluster Computing	Show More Options > Batch and Cluster 체크 시 사용 가능. Job scheduler를 통해 해석.		
Cluster Sweep	Show More Options > Batch and Cluster 체크 시 사용 가능. 관심 매개변수별로 지정된 해석을 job scheduler를 통해해석.		
Combine Solutions	두 개의 솔루션을 결합.		
Function Sweep	Definitions > Functions > Function Switch에서 정의한 함수 변화에 따른 해석 수행.		

Study	설명
Material Sweep	Materials > More Materials > Material Switch에서 정의한
	물성 변화에 따른 해석 수행.
Model Reduction	Time Dependent 또는 Frequency Domain 해석에서 감소 차
	수 모델 생성
Multigrid Level	Show More Options > Multigrid Level 적용 때 보임.
	Geometric multigrid로 해석 진행.
Parametric Sweep	관심 매개변수의 변화에 따른 해석 수행.
Sensitivity	민감도 해석.
Study Reference	다른 study를 이번 단계에서 참조.
Surrogate Model Training	Surrogate Model 생성을 위해 Surrogate Model Training 노
	드 추가.

Study (분야별 지원)	설명	
Chemical Applications		
AC Impedance, Initial Values	전기화학 전지에서의 전기화학적 임피던스 분광법(EIS) 계산.	
	두 개의 계산 단계가 만들어짐.1단계는 정상상태	
AC Impedance, Stationary	(Stationary) 해석, 2단계는 주파수 영역에서의 조화섭동	
	(harmonic perturbation) 해석.	
	두 개의 계산 단계가 만들어짐.1단계는 시변(Time	
AC Impedance, Time Dependent	Dependent) 해석, 2단계는 주파수 영역에서의 조화섭동	
	(harmonic perturbation) 해석.	
Cyclic Voltammetry (under Time	전압전류법(voltammetry) 실험의 시간 해석을 수행하기 위	
Dependent)	한 Electroanalysis 인터페이스에서 지원하는 해석.	
Stationary Plug Flow (under	Chemical Reaction Engineering 모듈이 있는 Reaction	
Stationary)	Engineering 인터페이스에서 사용. 반응기 부피에 따른 몰유	
Stationary)	량을 계산.	
	전기화학에서의 시간 해석 수행. 전역 ODE 종속변수(변형과	
	관련됨), 전해질/전극 전위 해석. 실제로 해석이 되는 변수에	
Time Dependent with Initialization	서 변형과 관련된 ALE(X, Y, Z)를 포함. 예를 들어, 메시 변형	
Time-Dependent with Initialization	이 가시적으로 해석 구조체에서 변하는 전기화학 시간 해석	
	에 유용함. Current Distribution Initialization 다음 Time-	
	Dependent로 구성됨.	
	실제로 해석이 되는 변수에서 변형과 관련된 ALE(X, Y, Z)를	
Time Dependent, Fixed Geometry	제외. 예를 들어, 메시 변형이 작은 전기화학 시간 해석에	
	유용함. Current Distribution Initialization 다음 Time-	
	Dependent, Fixed Geometry로 구성됨.	
Electrical and Optical Applications		

Study (분야별 지원)	설명
Bidirectionally Coupled Particle Tracing	입자 또는 광선 궤도와 고정된 필드의 상호 작용 모델링.
Bidirectionally Coupled Ray Tracing	외부 필드의 영향을 받는 광선 궤적을 계산.
Boundary Mode Analysis	전체 형상에 대해 주파수 영역 해석과 포트(경계)에서의 모 드 해석이 결합.
Coil Geometry Analysis	전도성 와이어 다발에 의해 생성되는 전류 밀도를 주는 Multi-Turn Coil Domain 노드에서 전류 흐름에 대한 고유 값 문제를 해결.
Time to Frequency Losses	Loss Calculation 하위 노드의 손실을 계산하는 데 사용되고, 일반적으로 시변 해석 다음으로 추가되는데, 시변 해석을 계 산하기 전에 Loss Calculation 하위 노드가 추가
Frequency-Stationary	Induction Heating과 Microwave Heating 인터페이스에서 적 용되며, Stationary에서의 설정과 동일함.
Frequency-Transient	Induction Heating, Microwave Heating, Inductively Coupled Plasma, Microwave Plasma 인터페이스에서 적용할 수 있으 며, Time-Dependent에서의 설정과 동일. 가령, 주파수 영역에서 전자기파를 해석하고, 시간 영역에서 온도(또는 전자 온도)를 해석.
Mean Energies (under Frequency Domain)	Plasma 모듈의 Boltzmann Equation, Two-Term Approximation 인터페이스에서 사용 가능. 평균 전자 에너 지의 값 배열 기입에 적용. Frequency Domain에서 해석.
Ray Tracing	광궤적 해석. Time Dependent 해석과 유사.
Reduced Electric Fields (under Frequency Domain)	Plasma 모듈의 Boltzmann Equation, Two-Term Approximation 인터페이스에서 적용.
Schrödinger-Poisson	Schrödinger-Poisson 시스템에 대한 자체 일관된 솔루션으로 사용.
Semiconductor Equilibrium	전하 캐리어가 열 평형 상태에 있는 푸아송의 방정식 해석
Semiconductor Initialization	불순물 도핑 농도 구배를 기반으로 한 조밀한 메시 사용.
Frequency-Stationary, One-Way Electromagnetic Heating	먼저 전자기장에 대한 주파수 도메인 해석 이후 열 전달식에 대해 정상상태 해석을 할 때, 전자기 열원을 소스 항으로사용. 유도 가열, 마이크로파 가열 또는 레이저 가열 인터페이스와 함께 사용.
Frequency-Transient, One-Way Electromagnetic Heating	순차적으로 전자기장에 대한 주파수 도메인 해석하고, 그 다음에 온도(또는 전자 온도)에 대해 시변 해석. 유도 가열, 마이크로파 가열 또는 레이저 가열 인터페이스와 함께 사용.
Frequency Domain, RF Adaptive Mesh	인쇄 회로 기판 및 RF 응용 분야에 대한 mesh adaptation 을 실행하는 주파수 도메인 해석.

Study (분야별 지원)	설명
Frequency Domain Source Sweep	Full S-parameter 매트릭스를 자동으로 추출하여 포트 및 집 중 포트(lumped port)와 같은 급전(feeding) 사이를 스위핑 하는 주파수 도메인 연구에 사용되고, Frequency Domain 해 석 타입과 설정은 유사.
Stationary Source Sweep	정전기학에서 용량 행렬과 같은 일괄 행렬을 추출.
Stationary Source Sweep with Initialization	Magnetic Fields, Currents Only 인터페이스에 대한 사전 설정 해석 단계입. Source Initialization 해석 단계와 Stationary Source Sweep 해석 단계로 구성. Coil Geometry Analysis와 유사.
Frequency Domain Source Sweep with Initialization	자기장, 전류 전용 인덕턴스 행렬과 같은 집중 행렬을 추출하기 위해 사전 설정되어 있고, 소스 초기화와 주파수 도메인 소스 스윕 연구 단계로 구성.
TEM Boundary Mode Analysis	정전위 또는 자기 벡터 전위의 면외 요소를 계산하는 데 사용. 주파수 도메인과 같은 주요 해석 단계를 풀기 전에 거쳐야하는 전처리 단계.
Time Dependent, Modal	모달 해석을 사용하여 시간에 따른 파동 문제를 분석.
EEDF Initialization	EEDF Initialization study는 다른 플라즈마 자유도를 해결하지 않고 전자 에너지 분포 함수 (EEDF)를 계산하는데 사용. 또한 시간 및 공간 의존 플라즈마 모델에 대한 초기 EEDF를 계산하는데 사용.
Time Periodic	모델의 주기적인 정상상태 해석.
Frequency-Time Periodic	주파수 도메인에서 전자기장 분포와 함께 Plasma, Time Periodic 인터페이스를 사용하는 모델을 위해 주기적인 정상 상태 솔루션을 계산.
Time Periodic to Time Dependent	시간주기 솔루션을 모델의 시간 종속 솔루션으로 변환.
Wavelength Domain	한개 이상의 파장에 대해 전자기 고조파 여기를 받는 선형 또는 선형화된 모델의 응답 계산.
	Fluid Applications
Frozen Rotor	회전계 상에서의 회전체 내의 유체가 완전발달흐름(Fully Developed Flow)으로 가정. Rotating Machinery, Laminar Flow와 Rotating Machinery, Turbulent Flow 인터페이스에서 적용.
Frozen Rotor with Initialization	회전으로 인한 구조체의 위상이 변하지 않는 회전계에서의 유체 해석. 회전계에서의 시간 해석의 초기 조건으로 사용 가능.
Stationary Free Surface	Free Rotor 또는 Free Rotor with Initialization 연구에 추가되어 자유 표면 변형을 해석.

Study (분야별 지원)	설명
Frozen Rotor with Stationary Free Surface	Stationary Free Surface 후처리 기능이 사용될 때, 회전체에서의 유체를 해석할 때 사용. 두 단계의 해석 타입 적용, 첫 번째는 Frozen Rotor, 두 번째는 Stationary Free Surface 단계.
Frozen Rotor with Initialization and Stationary Free Surface	Stationary Free Surface 후처리 기능이 사용될 때, 회전체에 서의 난류 유체를 해석할 때 사용. 세 단계의 해석 타입 적 용, 첫 번째는 Wall Distance Initialization, 두 번째는 Frozen Rotor, 마지막으로 Stationary Free Surface 단계.
Stationary with Initialization	초기치 설정이 필요한 정상상태 난류 모델에 사용.
Time dependent with Initialization	초기치 설정이 필요한 정상상태 난류 모델에 사용.
Thermal Perturbation, Eigenfrequency	Eigenfrequency study 단계가 뒤따르는 Stationary study 단계를 사용하여 평형 정상상태 온도장 주변의 진동을 계산.
Thermal Perturbation, Frequency Domain	Frequency-Domain, Perturbation study 단계가 뒤따르는 Stationary 연구 단계를 사용하여 평형 정상상태 온도장 주 변의 진동을 계산.
Time dependent with Phase	시간 종속 이상(two phase)유동 모델에서, level set 또는
Initialization	phase field 기능이 초기치를 필요로 하는 경우 사용
Stationary, One-Way NITF	2개의 Stationary study 단계: 유체 유동 변수에 대한 하나의 해석 그리고 열 전달 변수에 대한 하나의 해석. Nonisothermal Flow 및 Conjugate Heat Transfer 인터페이스와 함께 사용할 수 있음
Time Dependent, One-Way NITF	2개의 Time dependent study 단계: 유체 유동 변수에 대한 하나의 해석 그리고 시간 영역에서의 열전달 변수에 대한 하나의 해석. Nonisothermal Flow 및 Conjugate Heat Transfer 인터페이스와 함께 사용할 수 있음.
Frozen Rotor, One-Way NITF	2개의 Frozen rotor study 단계 : 하나는 유체 흐름 변수를 해석 그리고 다른 하나는 열 전달 변수를 해석. Rotating Machinery, Nonisothermal Flow 인터페이스와 함께 사용 가 능.
Stationary, One-Way with Initialization NITF	Wall distance initialization과 2개의 정상상태 연구 단계 : 유체 유동 변수에 대한 하나의 해석 그리고 열 전달 변수에 대한 해석 하나. Nonisothermal Flow 및 Conjugate Heat Transfer 인터페이스와 함께 사용.
Time Dependent, One-Way with Initialization NITF	Wall distance initialization과 2개의 Time dependent study 단계: 유체 유동 변수를 푸는 하나와 시간 도메인에서 열 전달 변수를 푸는 하나. Nonisothermal Flow 및 Conjugate Heat Transfer 인터페이스와 함께 사용.

Study (분야별 지원)	설명
Frozen Rotor, One-Way with Initialization NITF	2개의 frozen rotor study 단계 : 하나는 유체 흐름 변수를, 다른 하나는 열 전달 변수를 해석. Rotating Machinery, Nonisothermal Flow 인터페이스와 함께 사용 가능.
Stationary, One-Way MF	2개의 study 단계 : 유체 유동 변수에 대한 하나 그리고 연구 및 수분 이송 변수에 대한 하나. Moisture Flow 인터페이스와 함께 사용 가능.
Time Dependent, One-Way MF	2개의 study 단계: 유체 유동 변수에 대한 하나 그리고 시 간 도메인에서의 수분 이송 변수에 대한 하나. Moisture Flow 인터페이스와 함께 사용 가능.
	Heat Applications
Orbit Calculation	시변 해석, 우주선 궤도 모델링에 사용되는 자유도를 해결.
Orbital Temperature	시변 해석, 외부 복사는 여러 궤도 주기에서 재사용.
Orbit Thermal Loads	시변 해석, 외부 복사는 저장되고 우주선 궤도 모델링에 사용되는 자유도를 해결.
Mech	anical and Acoustic Applications
Bolt Pretension	Stationary study 단계의 특수한 경우이며, 전하중 볼트를 모 델링하는데 사용되는 특수 자유도를 해결.
Fatigue	피로해석에 적용. 하중 반복을 수행하여 Fatigue 인터페이스 에서의 피로 기준을 수행.
Linear Buckling	구조모델에서 고유치솔버를 이용하여 임계 하중 인자를 계 산. Stationary 해석 후 Linear Buckling 해석.
Eigenfrequency, Prestressed	정하중(static load)이 미리 주어진 상황에서의 고유진동수 계산. 구조 비선형이 필요. Stationary 이후 Eigenfrequency 해석.
Frequency Domain, Prestressed	정적 전하중(preload)에서 변동이 일어나는 조화하중응답 계산. 전하중으로부터 강성의 영향을 고려하기 위해 구조 비선형 필요. Stationary 이후 Frequency Domain 적용.
Frequency Domain, Prestressed, Modal	세 가지 study 단계는 미리 주어진 정하중이 주변에서 변동이 일어나는 조화하중응답 계산.
Random Vibration (PSD)	무작위 진동 분석을 위해 Global Definitions 하단의 세 개의 study와 여러 노드 추가.
Response Spectrum	응답 스펙트럼 분석을 위한 Eigenfrequency 해석 단계에 추가.
Time Dependent, Prestressed, Modal	세 가지 study 단계를 사용하여 미리 주어진 정하중 주변에 서 변동하는 시간 종속 부하에 대한 응답을 계산.
Stationary, One Way	MEMS 모듈 또는 Structural Mechanics 모듈에서 지원하는 Fluid-Structure Interaction 인터페이스에서 사용. Stationary,

Study (분야별 지원)	설명
	Fluid와 Stationary, Solid가 생성.
	MEMS 모듈 또는 Structural Mechanics 모듈에서 지원하는
Time Dependent, One Way	Fluid-Structure Interaction 인터페이스에서 사용. Time
	Dependent, Fluid와 Time Dependent, Solid가 생성.
Stationary, One Way with	MEMS 모듈 또는 Structural Mechanics 모듈과 함께 CFD 모
Initialization	듈에서 지원하는 Fluid-Structure Interaction 인터페이스에서
THE COLOR OF THE C	사용. 세 단계의 해석 단계가 만들어짐.
Time dependent, One Way with	MEMS 모듈 또는 Structural Mechanics 모듈과 함께 CFD 모
Initialization	듈에서 지원하는 Fluid-Structure Interaction 인터페이스에서
	사용. 세 단계의 해석 단계가 만들어짐.
Time Dependent with FFT	Time Dependent study 단계를 사용하여 시간 종속 해석을
Time Dependent with 111	한 후에 Time to Frequency FFT study 단계를 적용.
	Background Fluid Flow Coupling을 사용할 때 적용하는 해
Mapping	석 단계.
	Aeroacoustic Flow Source Coupling 다중 물리 기능에 대한
Transient Mapping	,
	Multipurpose Applications
Adaptiva Fraguency Sween	AWE 솔버를 사용하여 주파수 도메인에서 고조파 여기의 선
Adaptive Frequency Sweep	형 또는 선형화된 모델의 주파수 응답을 분석.
Frequency Domain, Modal	모달 해석을 사용하여 주파수 영역의 파동 문제를 분석.
Mode Analysis	고유치 솔버를 이용해 음파 또는 전자기파의 모드 계산.
	하나의 study로서, Eigenfrequency study 단계와 Modal
	Reduced-Order Model study 단계를 결합합니다. 또한
Modal Reduced-Order Model	Modal Reduced-Order Model study 단계를 추가하여, 모달
	솔버를 사용해 시간에 따른 파동 문제에 대한 감소된 차수
	의 모델 행렬을 내보낼 수 있음.
	자체가 독립적인 해석 타입은 아니며, ROM 생성을 용이하
Frequency Domain, AWE	게 하기 위해 Model Builder 트리에 노드를 추가하여 사용.
Reduced-Order Model	AWE 기술을 사용하여 주파수 영역 스윕을 위해 ROM을 설
	정하도록 구성.
	자체가 독립적인 해석 타입은 아니며, ROM 생성을 용이하
Frequency Domain, Modal	게 하기 위해 Model Builder 트리에 노드를 추가하여 사용.
Reduced-Order Model	모드 중첩을 사용하여 주파수 도메인 분석 위해 ROM을 설
	정하도록 구성.

Study (분야별 지원)	설명
Time Dependent, Modal Reduced-Order Model	자체가 독립적인 해석 타입은 아니며, ROM (reduced-order model) 생성을 용이하게 하기 위해 Model Builder 트리에 노드를 추가하여 사용. 모드 중첩을 사용하여 시간 종속 분석을 위해 ROM을 설정하도록 구성.
Optimization	목적함수와 제어변수를 통해 위상 최적화, 형상 최적화 등 최적화 해석. 솔버에서 직접 구현하거나, Optimization 인터 페이스를 통해 해석 가능.
Curve Fitting	시간 종속 모델에 대한 최소 제곱 매개변수 추정을 제공
Shape Optimization	형상 최적화에 이용
Topology Optimization	위상 최적화에 이용
Parameter Estimation	시간 해석 모델에서의 파라미터 추정.
Uncertainty Quantification	불확실성 정량화 해석
Small-Signal Analysis, Frequency	바이어스(bias) 해에서 작은 진동의 섭동주파수영역 계산에
Domain	적용. Stationary 이후 Frequency Domain, Perturbation 적용.

부록. 표 2 지원 솔버

Solver	설명
AWE Solver	Asymptotic Waveform Evaluation(AWE)을 통한 파리미터 해석. 주로 파장이 고려되는 모델을 해석할 때 사용함.
Dependent Variables	Initial Values of Variables solved For / Values of Variables Not Solved For에 대한 설정 내용과 배율(scailing)을 처리
Eigenvalue Solver	고유치 해석. 주로 Eigenfrequency 해석 타입에서 적용.
FFT Solver	FFT(Fast Fourier Transform)를 이용하여 시간 종속 또는 주파수 종속 입력에 대한 푸리에 변환을 고려.
Modal Reduction	Random Vibration (PSD) 스터디 생성 시 자동 생성, 1)시간 응답 또는 2)주파수 응답 해석
Modal Solver	모달이 고려되는 모델의 1)시간 응답 또는 2)주파수 응답 해석.
Optimization Solver	최적화. Optimization 모듈 필요.
Plug Flow Solver	Plug flow 반응기 해석. Chemical Reaction Engineering 모듈 필요.
Stationary Solver	정상상태 해석.
Time-Dependent Solver	시변 해석, 시간 단계는 내부적으로 처리.
Time Discrete Solver	시변 해석, 시간 단계는 이산화 처리.
References for the Solution Operation Nodes and Solvers	시변 해석, Runge-Kutta 방법 혹은 3차 Adams-Bashforth 솔버를 사용.

부록. 표 3 Preconditioner

Preconditioner	사용		
	GENERAL FRAMEWORK		
Multigrid – Geometric	타원(elliptic) 또는 포물선(parabolic) 시스템		
multigrid	TE(CIIIptic) TE TE E(parabolic) N= B		
Multigrid – Algebraic	 스칼라 문제 또는 거의 연성이 없는 타원 또는 포물선 타입의 다		
multigrid and smoothed	중물리현상		
aggregation AMG			
Domain Decomposition	분산 메모리 시스템에서의 큰 문제 또는 Direct Solver 대안용		
(Schwarz)			
Krylov Preconditioner	메시가 나이퀴스트(Nyquist) 기준을 충족하지 않는 헬름홀츠 (Helmholtz) 모델.		
FULL OR APPRO	DXIMATE FACTORIZATION OR APPROXIMATE INVERSE		
Incomplete LU	비대칭(nonsymmetric) 시스템		
SCGS	BEM이나 일반적인 preconditioner 또는 smoother 단계에서 비용이 많이 드는 설정 단계가 있지만 일반적으로 우수한 병렬 확장성을 보여 줌		
Direct Preconditioner	Direct Solver가 유효한 조그마한 영역		
	POINTWISE GENERAL PURPOSE		
SOR	대각선에 0이 없는 타원 타입 문제. Jacobi와 비교하였을 때 처리 속도가 빠름.		
Jacobi (diagonal scaling)	큰 정부호(positive definite) 모델		
Bl	BLOCK GAUSS-SEIDEL GENERAL PURPOSE		
SCGS	선형 요소(linear element)를 지닌 유체 문제		
SOR Line	SOR과 유사하나, 비등방성 메시을 적용한 모델. SOR보다 처리속 도가 느림.		
Vanka	시스템 행렬의 대각선에 0을 지닌 큰 부정수(indefinite) 문제		
	VECTOR ELEMENT METHODS		
Auxiliary-Space AMG	벡터 요소를 사용한 복잡한 값의 RF 문제 및 기타 시뮬레이션에 사용		
Auxiliary-Space Maxwell	정상상태 또는 시변 맥스웰(Maxwell) 식에서 파생한 컬(curl)-컬		
(AMS)	(curl) 문제		
SOR Gauge	Ungauged vector element로 된 Magnetostatics 현상		
SOR Vector	벡터 요소를 적용한 모델이 큰 전자기 분야.		
METHOD FOR FLUID FLOW SIMULATIONS			

Die I Nie 'e Cielee	과도 영역(transient regime)에서 비압축성 Navier-Stokes 방정식을
Block Navier-Stokes	사용하는 유체 흐름 모델

부록. 표 4 Plot Groups

메뉴	설명
Admittance Graph	S파라미터 결과에서 어드미턴스 스미스 플롯으로 도출
Annotation	그래프에 주석을 추가합니다.
Annotation Data	점, 텍스트 및 색상 데이터를 주석으로 표시
Arrow Data	점, 벡터 및 색상 데이터를 화살표로 표시
Arrow Line	선과 모서리에서 벡터 값 도출
Arrow Point	점에서 화살표로 벡터 값 도출
Arrow Surface	면에서 화살표로 벡터 값 도출
Arrow Volume	공간에서 화살표로 벡터 값 도출
Contour (Plot)	등고선으로 값 도출
Contour Series	일련의 등고선 플롯으로 시각화
Coordinate System Volume,	
Coordinate System Surface,	부피, 표면, 선, 점에서의 좌표계 도출. 이는 Definitions의
Coordinate System Line,	Coordinate Systems에서 설정한 좌표계를 보여줌
Coordinate System point	
Directivity	스피커에 대한 방향성을 도출. Acoustics Module 모듈 필요
Function	정의된 함수를 그래프로 도출
Global	시간 또는 파라미터를 포함한 함수 형식으로 된 전역 스칼라 값
Global	도출
Histogram	수량 분포를 보여주는 히스토그램 도출
Image	면에 외부 이미지를 나타냄
Impedance Graph	S파라미터 결과에서 임피던스 스미스 플롯으로 도출
Impulse Response	임펄스 응답 도출. Acoustics Module 모듈 필요
Interference Pattern	단면을 관통하는 다수의 광 간섭에 의한 단면에서의 세기를 보여 줌
Isosurface (Plot)	동표면에서의 값 도출
Joint Probability Distribution	결합 확률 분포 도출
	지정된 두께 위치에서 슬라이스 플롯으로 계층화된 셸 양을 도출.
Layered Material Slice	Composite Materials, AC/DC 또는 Heat Transfer 모듈 필요
Line	선에서의 값을 도출
Line Data	선으로 점, 요소, 색상 데이터 도출
Line Graph	형상 모서리 또는 지정한 선에서의 값 도출
Line Segments	그래프에 선분을 표현
Matrix Histogram	2차원 히스토그램으로 생성하기 원하는 선계산된 매트릭스 적용

메뉴	설명			
Max/Min Volume,				
Max/Min Surface,	공간, 면, 선, 점에서의 최대/최소 값 도출			
Max/Min Line,				
Max/Min Point				
Mesh (Plot)	생성된 메시 정보 도출			
Multislice	3차원 공간 내에서 세 방향 슬라이스에서의 값 도출			
Nyquist	주파수응답의 값(magnitude)과 상(phase)을 보여주는 Nyquist 선 도 도출			
Octave Band	주파수대역에서 주파수 반응을 도출			
Optical Aberration	2차원 공간 내에서 단색 수차의 다양한 형태를 도출			
Particle (Plot)	시간에 대한 전체 입자가 갖는 물리량 또는 한 입자의 물리량 값 변화를 도출			
Particle Tracing	유체 흐름 내의 무질량 입자에 대한 결과 도출. ODE 솔버를 사용하여 자체 계산. 입자는 유체에 영향을 주지 않음			
Particle Tracing with Mass	유체 흐름 내의 질량이 존재하는 입자에 대한 결과 도출. ODE 솔 버를 이용하여 자체 계산. 입자는 유체에 영향을 주지 않음			
Particle Trajectories and Filter for Particle Trajectories	Particle Tracing 모듈을 이용하여 해석된 입자 궤적 도식화			
Pellets	3차원에서 펠릿을 구 또는 슬라이스로 시각화.			
Phase Portrait	2차원 또는 2차원 축대칭에서 입자 궤적에 대한 데이터 도출			
Poincaré Map	Poincaré map을 이용한 입자 궤적 도출. Datasets의 Particle을 기반으로 Cut Plane을 이용			
Point	점에서의 값을 도출			
Point Data	점으로 점, 요소, 색상 데이터를 도출			
Point Graph	형상 꼭지점 또는 지정한 점에서의 값 도출			
Point Trajectories and Filter for Point Trajectories	3차원에서 점의 궤적을 시각화			
Polarization	주기 구조 해석 시 회절별로 편광상태를 나타내는 기능입니다.			
Principal Stress Volume, Principal Stress Surface, Principal Stress Line	구조해석에서 공간, 표면, 선에서의 주응력과 주변형 도출			
Radiation Pattern	전자기 또는 음향 압력 필드의 방사 패턴에 대한 전역 변수 값을 도출			
Ray (Plot) and Filter for Ray and Ray Trajectories	시간에 따른 광 변수 값 도출			
Ray Trajectories and Filter for Ray and Ray Trajectories	Geometrical Optics (Ray Optics 모듈) 또는 Ray Acoustics (Acoustics 모듈) 식으로 계산된 광 궤적을 보여 줌			

메뉴	설명
Reflection Graph	S파라미터 결과에서 반사정보 스미스 플롯으로 도출
Scatter Surface, Scatter Volume	공간과 표면에서의 산포도 도출
Slice	3차원 공간 내에서의 슬라이스로 값 도출
Sobol Index	Sobol 지수 (Uncertainty Quantification 모듈 필요)
Spot Diagram	특정 표면에서의 광학 수차를 도출
Streamline	백터 값을 도출
Streamline Multislice	면 위에 벡터 값을 도출
Streamline Surface	면 위에 벡터 값을 도출
Surface (Plot)	표면에서의 값 도출
Surface Data	면으로 점, 요소, 색상 데이터로 도출
Surface Slit	양쪽 면에 특정 값들을 나타내는 기능입니다
Table Annotation	테이블 형식을 사용하여 주석을 추가
Table Contour	테이블 형식을 사용하여 등고선 도출
Table Graph and Filter for Table Graph	테이블에 있는 데이터 도출
Table Histogram	테이블에 있는 데이터를 기반으로 Histogram을 생성
Table Point	테이블에 있는 점을 도출
Table Surface	테이블에 나온 데이터를 기반으로 2차원 결과를 도출
Through Thickness	지정한 점에서 계층화된 셸 수량의 두께 편차를 표시. Composite Materials, AC/DC 또는 Heat Transfer 모듈 필요
Tube Data	튜브로 점, 요소, 색상 데이터 도출
Volume	부피에서의 값 도출
Waterfall	매개변수 계산시 두 파라미터에 대한 결과 도출
Whirl	이산화된 회전 간격에서 로터 회전축에 대한 모드 형상을 도출
	CROSS SECTION PLOTS

메뉴	설명			
1D, 2D, and 3D Cross- Section Point Plots	Point Cross-Section Plot을 사용하면 임의의 공간 좌표에서 표현식을 쉽게 볼 수 있고, 결과적으로 Line Plot 생성.			
2D Cross-Section Line Plots and 3D Cross-Section Line Plots	2D 및 3D 형상을 통해 선을 만들어 선을 따라 시각화, Cross-Section Toolbar Buttons 사용방법에 대해 설명.			
3D Cross-Section Surface Plot	2D 형상에서 3D 모델을 통해 평면을 생성하여 평면에서 시각화 절단 평면은 3D에 포함된 2D 직교좌표계에 해당, Cross-Section Toolbar Buttons 사용방법에 대해 설명.			
	PLOT ATTRIBUTES			
Color Expression	결과 값을 색깔로 표현함.			
Comparison	그래프 플롯과 테이블 그래프를 비교			
Deformation	벡터의 변형을 표현함. 예) 구조 변위			
Energy Decay	임펄스 응답 플롯의 에너지 감쇠.			
Error Bars (Global, Point Graph, and Function)	그래프에 대한 에러바.			
Error Bars (Table Graph)	테이블 그래프에 대한 에러바			
Export Expressions	데이터를 내보내는 표현식을 추가.			
Filter, Filter for Particle Trajectories, Filter for Point Trajectories, Filter for Ray and Ray Trajectories, and Filter for Table Graph	Filter를 통해 결과의 일부분을 표현함.			
Graph Marker	그래프의 최소와 최대 마커와 같은 마커.			
Height Expression	2차원 결과에다가 높이의 정보를 적용하여 3차원화.			
Image (Plot Attribute)	표면이나 볼륨 이미지 추가			
Marker	최소와 최대 마커			
Material Apperance	그림에 Material Appearance를 사용			
Selection (Plot Attribute)	플롯을 표시할 형상 개체의 선택.			
Translation	2D 및 3D 그림에 변환 추가.			
Transparency	높이 표현식을 3D 및 2D 그림에 투명도 추가			
Visual Effects	높이 표현식을 사용하여 3D 및 2D 그림에 시각 효과 추가			

부록. 표 5 COMSOL Multiphysics 인터페이스

		AC/DC	모듈
지배식	태그	차원	솔버
			stationary
			stationary source sweep
Electric Currents ¹	ec	all	frequency domain
Electric Currents	ec	dimensions	time dependent
			small signal analysis, frequency domain
			eigenfrequency
			stationary
Electric Currents	ecis	3D	frequency domain
in Shells	ecis	30	time dependent
			eigenfrequency
			stationary
Electric Currents	ocic	3D	frequency domain
in Layered Shells	ecis	30	time dependent
			eigenfrequency
			stationary
		Not space dependent	frequency domain
Electrical Circuit	cir		time dependent
			small signal analysis, frequency domain
			eigenfrequency
			stationary
		all	time dependent
Electrostatics ¹	05		stationary source sweep
Electrostatics	es	dimensions	eigenfrequency
			frequency domain
			small signal analysis, frequency domain
			stationary
Electrostatics, Boundary	esbe	3D, 2D	stationary source sweep
Elements	CODE	JU, ZU	frequency domain
			small signal analysis, frequency domain

지배식 태그 차원 출버 Magnetic Fields¹ mf Magnetic Fields¹ mf Magnetic Fields¹ mf Magnetic Fields mfh Formulation mfh Magnetic Fields, No Currents Magnetic Fields, Nagnetic Fields, Magnetic Fields, Stationary Stationary Stationary Stationary Magnetic Fields, Magnetic Fields, Magnetic Fields, Stationary St	AC/DC 모듈					
Magnetic Fields Magnetic Fields Magnetic Field Formulation Magnetic Field Formulation Magnetic Field Formulation Magnetic Field Formulation Magnetic Fields Formulation Magnetic Fields Formulation Magnetic Fields Formulation Magnetic Fields Formulation Magnetic Fields, No Currents	지배식	태그	차원	솔버		
Magnetic Fields mf 3D, 2D, 2D axisymmetric mg 3D, 2D, 2D axisymmetric mg Magnetic Field Formulation mg Magnetic Field Formulation mg Magnetic Field Formulation mg Magnetic Fields Formulation mg Magnetic Fields Formulation mg Magnetic Fields, No Currents mg Magnetic Fields, Mg				stationary		
Magnetic Fields ¹ Magnetic Fields ¹ Magnetic Field Magnetic Field Formulation Magnetic Field Formulation Magnetic Field Formulation Magnetic Field Formulation Magnetic Fields Magnetic Fields Magnetic Fields Axisymmetric Magnetic Fields, No Currents				frequency domain		
Magnetic Fields mf axisymmetric small signal analysis, frequency domain coil geometry analysis (3D only) time to frequency losses eigenfrequency Magnetic Field Formulation mfh axisymmetric mfh Magnetic Fields, No Currents mfnc axisymmetric mfnc			טר טר טר	time dependent		
Coil geometry analysis (3D only) time to frequency losses eigenfrequency Stationary frequency domain time dependent small signal analysis, frequency domain time to frequency losses Stationary frequency domain time to frequency losses	Magnetic Fields ¹	mf		small signal analysis, frequency domain		
Magnetic Field Formulation mfh axisymmetric Magnetic Fields, No Currents mfnc mfnc Magnetic Fields, No Currents mfnc mfnc mfnc axisymmetric mfnc axisymmetric mfnc mfnc axisymmetric mfnc mfnc axisymmetric mfnc axisymmetric mfnc mfnc axisymmetric mfnc mfnc mfnc axisymmetric mfnc mfnc mfnc mfnc mfnc mfnc mfnc mfnc axisymmetric mfnc mfn			axisyiiiiietiic	coil geometry analysis (3D only)		
Magnetic Field Formulation mfh axisymmetric Magnetic Fields, No Currents mfh Tormulation mfh Axisymmetric mfh axisymmetric stationary frequency domain time dependent small signal analysis, frequency domain time to frequency losses stationary frequency domain time to frequency domain time to frequency domain time to frequency domain time dependent time dependent time dependent				time to frequency losses		
Magnetic Field Formulation mfh axisymmetric mfh Tormulation mfh axisymmetric mfh axisymmetric frequency domain time dependent small signal analysis, frequency domain time to frequency losses stationary frequency domain time dependent				eigenfrequency		
Magnetic Field Formulation mfh axisymmetric mgh axisymmetric mgh axisymmetric small signal analysis, frequency domain time to frequency losses stationary frequency domain time dependent time dependent time dependent time to frequency losses				stationary		
Formulation mfh axisymmetric axisymmetric time dependent small signal analysis, frequency domain time to frequency losses stationary frequency domain axisymmetric Magnetic Fields, No Currents mfnc axisymmetric axisymmetric time dependent time to frequency losses	Magnetic Field		30 30 30	frequency domain		
small signal analysis, frequency domain time to frequency losses Magnetic Fields, No Currents Magnetic Fields, No Currents Magnetic Fields, Stationary frequency domain time dependent time to frequency losses		mfh		time dependent		
Magnetic Fields, No Currents Magnetic Fields, No Currents axisymmetric stationary frequency domain time dependent time to frequency losses	Torridation		axisyiiiiiciic	small signal analysis, frequency domain		
Magnetic Fields, No Currents axisymmetric The property of time dependent time to frequency losses				time to frequency losses		
No Currents mfnc axisymmetric time dependent time to frequency losses				stationary		
No Currents axisymmetric time dependent time to frequency losses	Magnetic Fields,	mfnc	3D, 2D, 2D	frequency domain		
	No Currents		axisymmetric	time dependent		
Magnetic Fields,				time to frequency losses		
	Magnetic Fields,					
No Currents, Boundary mfncbe 3D, 2D stationary	No Currents, Boundary	mfncbe	3D, 2D	stationary		
Elements	Elements					
stationary				stationary		
Magnetic Fields, stationary source sweep with initialization	Magnetic Fields,		3D			
mfco 3D currents Only frequency domain source sweep with		mfco				
initialization	,			, ,		
stationary				stationary		
frequency domain				frequency domain		
Magnetic and Electric 3D, 2D, 2D time dependent	Magnetic and Electric		3D, 2D, 2D	time dependent		
Fields axisymmetric stationary source sweep	Fields	mef	axisymmetric	stationary source sweep		
frequency domain source sweep				frequency domain source sweep		
coil geometry analysis (3D only)				coil geometry analysis (3D only)		

AC/DC 모듈				
지배식	태그	차원	솔버	
Rotating Machinery, Magnetic	rmm	3D, 2D	stationary time dependent, coil geometry analysis (3D only) frequency domain time to frequency losses	
Magnetic Machinery, Rotating, Time Periodic	mmtp	2D	stationary time dependent frequency domain	
Magnetohydrodynamics	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency-stationary frequency-transient	
Particle Tracing		I		
Particle Field Interaction, Nonrelativistic ⁴	_	3D, 2D, 2D axisymmetric	bidirectionally coupled particle tracing time dependent	
Particle Field Interaction, Relativistic ⁴	_	3D, 2D, 2D axisymmetric	bidirectionally coupled particle tracing time dependent	
Charged Particle Tracing ⁴	cpt	3D, 2D, 2D axisymmetric	bidirectionally coupled particle tracing time dependent	
Heat Transfer				
Electromagnetic Heating				
Induction Heating ²	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency-stationary frequency-transient frequency-stationary, one-way electromagnetic heating frequency-transient, one-way electromagnetic	

AC/DC 모듈				
지배식	태그	차원	솔버	
			heating small-signal analysis, frequency domain	
Joule Heating ^{1,2}		all dimensions	stationary time dependent frequency-transient small-signal analysis frequency domain frequency-stationary frequency-stationary, one-way electromagnetic heating frequency-transient, one-way electromagnetic heating	
Structural Mechanics				
Thermal–Structure I	nteraction	1		
Joule Heating and Thermal Expansion ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Electromechanics				
Electromechanics ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency, prestressed time dependent frequency domain, prestressed	
Electromechanics, Boundary Elements ^{2,3}	_	3D, 2D	stationary eigenfrequency, prestressed time dependent frequency domain, prestressed	
Piezoelectricity				

AC/DC 모듈				
지배식	태그	차원	솔버	
Piezoelectricity, Solid ²		3D, 2D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal small-signal analysis, frequency domain linear buckling	
Piezoelectricity, Layered Shell ^{2,7}		3D	stationary eigenfrequency time dependent frequency domain	
Magnetomechanics				
Piezomagnetism ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed	
Nonlinear, Magnetostriction ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed	

	모듈		
지배식	태그	차원	솔버
			frequency domain, prestressed
Magnetomechanics ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed
Magnetomechanics, No Currents ^{2,3}		3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed
Magnetic–Elastic Interaction in Rotating Machinery ^{2,5}	_	3D, 2D	stationary time dependent frequency domain

AC/DC 모듈				
지배식	태그	차원	솔버	
Magnetic–Rigid Body Interaction in Rotating Machinery ^{2,6}		3D, 2D	stationary time dependent frequency domain	
Electrostriction				
Ferroelectroelasticity ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency domain	
Electrostriction ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency domain	

Piezoresistivity

- ¹ 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적인 기능들이 포함되어 있습니다.
- 2 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자동적으로 적용됩니다.
- ³ Structure Mechanics Module 또는 MEMS Module을 필요로 합니다.
- ⁴ Particle Tracing Module을 필요로 합니다.
- ⁵ Structural Mechanics Module을 필요로 합니다.
- ⁶ Multibody Dynamics Module을 필요로 합니다.
- ⁷ Composite Materials Module을 필요로 합니다.

Acoustic 모듈					
지배식	태그	차원	솔버		
Pressure Acoustics					
			eigenfrequency		
			frequency domain		
			frequency domain, modal		
Pressure Acoustics,	acpr	all	adaptive frequency sweep		
Frequency Domain ¹	асрі	dimensions	mode analysis (2D and 1D axisymmetric		
			models only)		
			boundary mode analysis (3D and 2D axisy		
			mmetric models only)		
			eigenfrequency		
			frequency domain		
			frequency domain, modal		
Pressure Acoustics, Transient	actd	all dimensions	time dependent		
			time dependent, modal		
			mode analysis (2D and 1D axisymmetric models		
			only)		
Draceura Acquetics Poundary		3D, 2D			
Pressure Acoustics, Boundary	acbm		mode analysis		
Mode		axisymmetric			
Pressure Acoustics, Boundary					
Elements	pabe	3D, 2D	frequency domain		
Liements					
Pressure Acoustics, Time		3D, 2D, 2D			
Explicit	pate	axisymmetric	time dependent		
Pressure Acoustics,	paas	3D	frequency domain		
Asymptotic Scattering	Paas	3D	mequency domain		
_					
Pressure Acoustics,	pakh	3D	frequency domain		
Kirchhoff–Helmholtz	·				

Acoustic 모듈				
지배식	태그	차원	솔버	
Elastic Waves				
Slid Mechanics (Elastic Waves) ¹	solid	3D, 2D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed mode analysis time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, modal reduced-order model frequency domain, ME reduced-order model modal reduced-order model	
Poroelastic Waves	pelw	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	
Elastic Waves, Time Explicit	elte	3D, 2D, 2D axisymmetric	time dependent	
Piezoelectric Waves, Time Explicit		3D, 2D, 2D axisymmetric	time dependent	
Acoustic-Structure Intera	ction			
Acoustic-Solid Interaction, Frequency Domain ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	

Acoustic 모듈				
지배식	태그	차원	솔버	
Acoustic-Solid Interaction, Transient ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal time dependent time dependent, modal	
Acoustic-Shell Interaction, Frequency Domain ^{2,3}	_	3D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	
Acoustic-Shell Interaction, Transient ^{2,3}	_	3D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal time dependent time dependent, modal	
Acoustic-Piezoelectric Interaction, Frequency Domain ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	
Acoustic-Piezoelectric Interaction, Transient ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal time dependent time dependent, modal	
Acoustic-Solid-Poroelas tic Waves Interaction ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	
Acoustic-Poroelastic Waves Interaction ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal	
Acoustic-Solid Interaction, Time Explicit	_	3D, 2D	time domain	
Aeroacoustics				
Linearized Euler, Frequency	lef	3D, 2D, 2D	frequency domain	

Acoustic 모듈				
지배식	태그	차원	솔버	
Domain		axisymmetric, 1D	eigenfrequency	
Linearized Euler, Transient	let	3D, 2D, 2D axisymmetric, 1D	time dependent	
Linearized Euler, Boundary Mode	lebm	3D, 2D axisymmetric	mode analysis	
Linearized Potential Flow, Frequency Domain	ae	all dimensions	frequency domain mode analysis (2D and 1D axisymmetric models only)	
Linearized Potential Flow, Transient	aetd	all dimensions	frequency domain time dependent mode analysis (2D and 1D axisymmetric models only)	
Linearized Potential Flow, Boundary Mode	aebm	3D, 2D axisymmetric	mode analysis	
Compressible Potential Flow	cpf	all dimensions	stationary time dependent	
Linearized Navier-Stokes, Frequency Domain	Insf	3D, 2D, 2D axisymmetric, 1D	frequency domain eigenfrequency	
Linearized Navier-Stokes, Transient	Inst	3D, 2D, 2D axisymmetric, and 1D	time dependent	
Linearized Navier-Stokes, Boundary Mode	Insbm	3D, 2D axisymmetric	mode analysis	
Thermoviscous Acoustics	;			
Thermoviscous Acoustics, Frequency Domain	ta	all dimensions	eigenfrequency frequency domain frequency domain, modal	

Acoustic 모듈				
지배식	태그	차원	솔버	
			mode analysis (2D and 1D axisymmetric models only)	
Thermoviscous Acoustics, Transient	tatd	all dimensions	time dependent	
Thermoviscous Acoustics, Boundary Mode	tabm	3D, 2D axisymmetric	mode analysis	
Acoustic-Thermoviscous Acoustic Interaction, Frequency Domain ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal boundary mode analysis (3D and 2D axisymmetric only) mode analysis (2D only)	
Thermoviscous Acoustic- Solid Interaction, Frequency Domain ³	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain frequency domain, modal mode analysis (2D only)	
Thermoviscous Acoustic- Shell Interaction, Frequency Domain ^{2,3}	_	3D	eigenfrequency frequency domain frequency domain, modal	
Thermoviscous Acoustic–The rmoelasticity Interaction, Fre quency Domain ⁵	_	3D, 2D, 2D axisymmetric	frequency domain perturbation	
Thermoviscous Acoustic–The rmoelasticity Interaction, Transient ⁵	_	3D, 2D, 2D axisymmetric	time dependent	
Ultrasound				
Convected Wave Equation, Time Explicit	cwe	3D, 2D, 2D axisymmetric	time dependent	
Nonlinear Pressure Acoustics, Time Explicit	nate	3D, 2D, 2D axisymmetric	time dependent	
Geometrical Acoustics				

Acoustic 모듈				
지배식	태그	차원	솔버	
Day Acqueties	rac	3D, 2D, 2D	ray tracing	
Ray Acoustics	Tac	axisymmetric	time dependent	
			eigenvalue	
Acoustic Diffusion Equation	ade	3D	stationary	
			time dependent	
Pipe Acoustics				
Pipe Acoustics, Frequency	pofd	3D 3D	eigenfrequency	
Domain	pafd	3D, 2D	frequency domain	
Pipe Acoustics, Transient	patd	3D, 2D	time dependent	
Structural Mechanics				
			stationary	
			eigenfrequency	
			eigenfrequency, prestressed	
			mode analysis	
		3D, 2D, 2D	time dependent	
		Axisymmetric,	time dependent, modal	
Solid Mechanics ¹	solid	1D, 1D	time dependent, modal reduced-order model	
		axisymmetric	frequency domain	
		axisymmetric	frequency domain, modal	
			frequency domain, prestressed	
			frequency domain, prestressed, modal	
			frequency domain, modal reduced-order model	
			frequency domain, AWE reduced-order model	
Piezoelectricity				

	Acoustic 모듈				
지배식	태그	차원	솔버		
Piezoelectricity, Solid ³		3D, 2D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal small-signal analysis, frequency domain		
Magnetomechanics					
Piezomagnetism ^{3,4}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed		
Nonlinear Magnetostriction ^{3,4}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed		
Magnetomechanics ^{3,4}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent		

Acoustic 모듈				
지배식	태그	차원	솔버	
			frequency domain	
			small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	
			stationary	
Magnetomechanics, No Currents ^{3,4}		3D, 2D, 2D axisymmetric	eigenfrequency	
			time dependent	
			frequency domain	
			small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	

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² Structure Mechanics Module 및 Acoustics Module이 필요합니다.

³ 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자동적으로 적용됩니다.

⁴ AC/DC Module이 필요합니다.

⁵ MEMS Module 및 Acoustics Module이 필요합니다.

Battery Design 모듈				
지배식	태그	차원	솔버	
Chemical Species T	ransport			
Transport of Diluted	1.1.	.11 .12	stationary	
Species	tds	all dimensions	time dependent	
Transport of	4	-II -I:i	stationary	
Concentrated Species	tcs	all dimensions	time dependent	
Chemistry	chem	all dimensions	stationary	
Chemistry	Cileiii	all difficults	time dependent	
			stationary	
Nernst-Planck-Poisson	tds+es	all dimensions	time dependent	
Equations	tus+es	all difficultions	stationary source sweep	
			small-signal analysis, frequency domain	
			stationary	
Electrophoretic	el	all dimensions	stationary with initialization	
Transport	еі		time dependent	
			time dependent with initialization	
Transport of Diluted		stationary		
Species in Porous	tds	all dimensions	stationary	
Media			time dependent	
Transport of		tcs all dimensions	stationary	
Concentrated Species	tcs		time dependent	
in Porous Media			time dependent	
			stationary (3D, 2D, and 2D axisymmetric	
Surface Reactions	sr	all dimensions	models only)	
			time dependent	
Transport of Diluted	dsf	3D, 2D, 2D	stationary	
Species in Fractures	usi	axisymmetric	time dependent	
Reacting Flow				
Laminar Flow		3D, 2D, 2D	stationary	
Lammar How		axisymmetric	time dependent	
Laminar Flow,		3D, 2D, 2D	stationary	
Diluted Species		axisymmetric	time dependent	

Battery Design 모듈						
지배식	태그	차원	솔버			
Nonisothermal Rea	Nonisothermal Reacting Flow					
Laminar Flow		3D, 2D, 2D	stationary			
Laminai Flow	_	axisymmetric	time dependent			
Reacting Flow in Po	orous Med	ia				
Transport of Diluted	_	3D, 2D, 2D	stationary			
Species		axisymmetric	time dependent			
Transport of		3D, 2D, 2D	stationary			
Concentrated Species		axisymmetric	time dependent			
Electrochemistry						
			stationary			
Primary Current			stationary with initialization			
Distribution	cd		time dependent			
		all dimensions	time dependent with initialization			
Secondary Current			AC impedance, initial values			
Distribution			AC impedance, stationary			
			AC impedance, time dependent			
Tertiary Current			stationary			
Distribution, Nernst-			stationary with initialization			
Planck		all dimensions	time dependent			
(Electroneutrality, Water-Based with	tcd		time dependent with initialization			
Electroneutrality,			AC impedance, initial values			
Supporting			AC impedance, stationary			
Electrolyte)			AC impedance, time dependent			
			stationary			
			time dependent			
Flactroopalysis	+ad	all dimensions	AC impedance, initial values			
Electroanalysis tcd	ica	an unnensions	AC impedance, stationary			
			AC impedance, time dependent			
			cyclic voltammetry			
Electroda Chall	olc	3D, 2D, 2D	stationary			
Electrode, Shell els	612	axisymmetric	time dependent			

	Battery Design 모듈				
지배식	태그	차원	솔버		
Battery Interfaces					
Lithium Ion Batton			stationary		
Lithium-Ion Battery			time dependent		
(Binary 1:1 Liquid	liion	all dimensions	AC impedance, initial values		
Electrolyte,			AC impedance, stationary		
Single-Ion Conductor)			AC impedance, time dependent		
			stationary		
Dottom with Dinom			time dependent		
Battery with Binary	batbe	all dimensions	AC impedance, initial values		
Electrolyte			AC impedance, stationary		
			AC impedance, time dependent		
	leadbat	all dimensions	stationary		
			time dependent		
Lead-Acid Battery			AC impedance, initial values		
			AC impedance, stationary		
			AC impedance, time dependent		
Cinalo Darticlo Pattory	cnh	all dimensions	time dependent		
Single Particle Battery	spb		time dependent with initialization		
Lumped Dattery	Ila	all dimensions	time dependent		
Lumped Battery	lb		AC impedance, initial values		
Pattony Equivalent		Not space	stationary		
Battery Equivalent Circuit	ec	Not space	time dependent		
Circuit		dependent	frequency domain		
Battery Pack	Вр	3D	time dependent		
Fluid Flow					
Porous Media and	Porous Media and Subsurface Flow				
		30 30 30	stationary		
Brinkman Equations	br	3D, 2D, 2D	stationary time dependent		
		axisymmetric	time dependent		

Battery Design 모듈				
지배식	태그	차원	솔버	
Darcy's Law	dl	all dimensions	stationary	
Dailey 3 Law	ŭi.	all difficultions	time dependent	
Free and Porous	fp	3D, 2D, 2D	stationary	
Media Flow, Brinkman	īρ	axisymmetric	time dependent	
Free and Porous		3D, 2D, 2D	stationary	
Media Flow, Darcy		axisymmetric	time dependent	
Nonisothermal Flov	v			
			stationary	
Brinkman Equations		3D, 2D, 2D	time dependent	
Brillikiliali Equations	_	axissymmetric	stationary, one-way NITF	
			time dependent, one-way NITF	
Heat Transfer				
Heat Transfer in	ht	all dimensions	stationary	
Porous Media	111	an unnensions	time dependent	

CFD 모듈						
지배식	태그	차원	솔버			
Chemical Species Transport						
Transport of Diluted	+dc		stationary			
Species ¹	tds	all dimensions	time dependent			
Transport of Concentrated	tcs	all dimensions	stationary			
Species	ics	all difficultions	time dependent			
Transport of Diluted	tds	all dimensions	stationary			
Species in Porous Media	tus	all difficultions	time dependent			
Transport of Concentrated	tee	all dimensions	stationary			
Species in Porous Media	tcs	all difficultions	time dependent			
Vapor Flow						
Laminar Flow, Concentrate	_	3D, 2D, 2D	stationary			
d Species ⁽³⁾		axisymmetric	time dependent			
Laminar Flow, Concentrate	_	3D, 2D, 2D	stationary			
d Species, Moving Mesh ⁽³⁾		axisymmetric	time dependent			
Turbulent Flow, Concentrated Species						
Turbulent Flow, k-ε ⁽³⁾		3D, 2D, 2D	stationary			
		axisymmetric	time dependent			
Turbulent Flow, k-ω ⁽³⁾	_	3D, 2D, 2D	stationary with initialization			
rarbatent flow, k w		axisymmetric	time dependent with initialization			
Turbulent Flow, SST ⁽³⁾	_	3D, 2D, 2D	stationary with initialization			
furbulent flow, 331		axisymmetric	time dependent with initialization			
Turbulent Flow, Low Re k-		3D, 2D, 2D	stationary with initialization			
ε ⁽³⁾	_	axisymmetric	time dependent with initialization			
Reacting Flow						
Laminan Flaur		3D, 2D, 2D	stationary			
Laminar Flow	_	axisymmetric	time dependent			
Laminar Flow,	_	3D, 2D, 2D	stationary			
Diluted Species ¹		axisymmetric	time dependent			
Turbulent Flow						
Turbulant Flow k s		3D, 2D, 2D	stationary			
Turbulent Flow, k-ε		axisymmetric	time dependent			

CFD 모듈			
지배식	태그	차원	솔버
Turbulent Flow, k-ω	-	3D, 2D, 2D	stationary
		axisymmetric	time dependent
Turbulent Flow, SST	_	3D, 2D, 2D	stationary with initialization
		axisymmetric	time dependent with initialization
Turbulent Flow, Low Re k-ε	_	3D, 2D, 2D	stationary with initialization
		axisymmetric	time dependent with initialization
Turbulent Flow, Diluted Species			
Turbulent Flow, k-ε	_	3D, 2D, 2D	stationary
		axisymmetric	time dependent
Turbulent Flow, k-ω	_	3D, 2D, 2D	stationary
		axisymmetric	time dependent
Turbulent Flow, SST	_	3D, 2D, 2D	stationary with initialization
		axisymmetric	time dependent with initialization
Turbulent Flow, Low Re k-ε	_	3D, 2D, 2D	stationary with initialization
		axisymmetric	time dependent with initialization
High Mach Number Reacting Flow			
Laminar Flow ⁽³⁾	_	3D, 2D, 2D	stationary
		axisymmetric	time dependent
_aminar Flow, Diluted Spe		3D, 2D, 2D	stationary
cies		axisymmetric	time dependent
Turbulent Flow ⁽³⁾			
Turbulent Flow, k-ε ⁽³⁾	_	3D, 2D, 2D	stationary
		axisymmetric	time dependent
Turbulent Flow, Spalart–All maras ⁽³⁾	spf	3D, 2D, 2D	stationary with initialization
		axisymmetric	time dependent with initialization
Turbulent Flow, Diluted Species			
Turbulent Flow, k-ε	_	3D, 2D, 2D	stationary
		axisymmetric	time dependent

spf axisymmetric time dependent with initialization Reacting Flow in Porous Media Transport of Diluted Species — 3D, 2D, 2D axisymmetric stationary time dependent Transport of Concentrated Species — 3D, 2D, 2D axisymmetric stationary time dependent Dispersed Two-Phase Flow with Species Transport Laminar Flow 3D, 2D stationary time dependent Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization time dependent with initialization		CFD 모듈					
spf axisymmetric time dependent with initialization Reacting Flow in Porous Media Transport of Diluted Species 3D, 2D, 2D, 2D axisymmetric time dependent Transport of Concentrated Species 3D, 2D, 2D axisymmetric time dependent Dispersed Two-Phase Flow with Species Transport Laminar Flow 3D, 2D stationary time dependent Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary with initialization time dependent Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependen	지배식	태그	차원	솔버			
Reacting Flow in Porous Media Transport of Diluted Species — 3D, 2D, 2D axisymmetric time dependent Transport of Concentrated Species — 3D, 2D, 2D axisymmetric time dependent Dispersed Two-Phase Flow with Species Transport Laminar Flow 3D, 2D Turbulent Flow, Laminar Flow — 3D, 2D Turbulent Flow, k-ε — 3D, 2D Turbulent Flow, k-ε — 3D, 2D Turbulent Flow, k-ε — 3D, 2D Turbulent Flow, SST — 3D, 2D Turbulent Flow, Low Re k-ε — 3D, 2D Single-Phase Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D axisymmetric stationary time dependent with initialization time dependent Fluid Flow Spf 3D, 2D, 2D axistionary time dependent Laminar Flow¹ spf 3D, 2D, 2D axistionary time dependent Viscoelastic Flow vef 3D, 2D, 2D axistionary time dependent Turbulent Flow, Algebraic spf 3D, 2D, 2D axistionary time dependent Turbulent Flow	Turbulent Flow, Spalart–All	an f	3D, 2D, 2D	stationary with initialization			
Transport of Diluted Species Transport of Concentrated Species Transport Dispersed Two-Phase Flow with Species Transport Laminar Flow Turbulent Flow Turbulent Flow, k-ε Turbulent Flow, k-ε Turbulent Flow, k-ε Turbulent Flow, sST Turbulent Flow, SST Turbulent Flow, SST Turbulent Flow, Low Re k-ε Turbulent Flow, Low Re k-ε Turbulent Flow Single-Phase Flow Creeping Flow Spf 3D, 2D, 2D axisymmetric time dependent Turbulent Flow¹ Spf 3D, 2D, 2D axisymmetric time dependent Turbulent Flow¹ Spf 3D, 2D, 2D axisymmetric time dependent Timbulent Flow Viscoelastic Flow Vef 3D, 2D, 2D axisymmetric time dependent Turbulent Flow Turbulent Flow Viscoelastic Flow Vef 3D, 2D, 2D axisymmetric time dependent Turbulent Flow, Algebraic Spf 3D, 2D, 2D stationary time dependent Turbulent Flow, Algebraic Spf 3D, 2D, 2D stationary time dependent Stationary time dependent Stationary time dependent Turbulent Flow Algebraic Spf 3D, 2D, 2D stationary time dependent	maras	spi	axisymmetric	time dependent with initialization			
Species — axisymmetric time dependent Transport of Concentrated Species — 3D, 2D, 2D stationary time dependent Dispersed Two-Phase Flow with Species Transport Laminar Flow 3D, 2D stationary time dependent Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization time dependent with initialization waisymmetric time dependent time dependent Turbulent Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow Algebraic spf 3D, 2D, 2D stationary with initialization waisymmetric time dependent	Reacting Flow in Porou	s Media	ı				
Transport of Concentrated Species — 3D, 2D, 2D stationary time dependent Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, Low Re k-ε — 3D, 2D stationary with initialization time dependent with initialization axisymmetric time dependent with initialization time dependent with initialization time dependent with initialization system dependent with initialization with initialization system dependent with initialization with dependent with initialization system dependent with initialization	Transport of Diluted		3D, 2D, 2D	stationary			
Species Axisymmetric time dependent	Species	_	axisymmetric	time dependent			
Dispersed Two-Phase Flow with Species Transport Laminar Flow 3D, 2D stationary time dependent Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization time dependent with initialization Turbulent Flow, Low Re k-ε — 3D, 2D stationary with initialization time dependent with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D axisymmetric stationary time dependent Laminar Flow¹ spf 3D, 2D, 2D axisymmetric stationary time dependent Viscoelastic Flow vef 3D, 2D, 2D axisymmetric stationary time dependent Turbulent Flow Turbulent Flow	Transport of Concentrated		3D, 2D, 2D	stationary			
Laminar Flow 3D, 2D stationary time dependent Turbulent Flow Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization time dependent with initialization Turbulent Flow, Low Re k-ε — 3D, 2D stationary with initialization time dependent with initialization Turbulent Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D axistionary time dependent Laminar Flow¹ spf 3D, 2D, 2D axistionary time dependent Viscoelastic Flow vef 3D, 2D, 2D axistionary time dependent Turbulent Flow spf 3D, 2D, 2D axistionary time dependent Turbulent Flow spf 3D, 2D, 2D axistionary time dependent Turbulent Flow spf 3D, 2D, 2D axistionary time dependent Turbulent Flow spf 3D, 2D, 2D axistionary time dependent	Species	_	axisymmetric	time dependent			
Turbulent Flow, k-ε Turbulent Flow, k-ε Turbulent Flow, k-ω Turbulent Flow, SST Turbulent Flow, SST Turbulent Flow, SST Turbulent Flow, SST Turbulent Flow, Low Re k-ε Turbulent Flow Turbulent Flow Turbulent Flow Turbulent Flow Single-Phase Flow Creeping Flow Spf AD, 2D, 2D AD, 2D Stationary with initialization time dependent with initialization time dependent with initialization time dependent with initialization Turbulent Flow Single-Phase Flow Creeping Flow Spf AD, 2D, 2D Axisymmetric Turbulent Flow, Algebraic Spf AD, 2D, 2D Stationary Stationar	Dispersed Two-Phase	Flow	with Species Tra	ansport			
Turbulent Flow Turbulent Flow, k-ε Turbulent Flow, k-ω Turbulent Flow, k-ω Turbulent Flow, SST Turbulent Flow, SST Turbulent Flow, Low Re k-ε Turbulent Flow Turbulent Flow Turbulent Flow, Low Re k-ε Turbulent Flow Single-Phase Flow Creeping Flow Single-Phase Flow Laminar Flow¹ Spf 3D, 2D, 2D axisymmetric axisymmetric axisymmetric time dependent stationary with initialization time dependent with initialization time dependent stationary time dependent	Laminar Flour		30 30	stationary			
Turbulent Flow, k-ε — 3D, 2D stationary time dependent Turbulent Flow, k-ω — 3D, 2D stationary with initialization time dependent with initialization stationary with initialization time dependent with initialization stationary with initialization stationary with initialization time dependent with initialization stationary with initialization stationary with initialization time dependent with initialization stationary with initialization stationary size dependent with initialization stationary size dependent size dependent stationary size dependent siz	Laminar Flow		3D, 2D	time dependent			
Turbulent Flow, k-ε — 3D, 2D time dependent Turbulent Flow, k-ω — 3D, 2D stationary time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization Turbulent Flow, Low Re k-ε — 3D, 2D stationary with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D axisymmetric time dependent Laminar Flow¹ spf axisymmetric axisymmetric time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary time dependent Single-Phase Flow spf axisymmetric time dependent Spf axisymmetric time dependent Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Turbulent Flow						
time dependent Stationary time dependent Turbulent Flow, SST — 3D, 2D Turbulent Flow, SST — 3D, 2D Turbulent Flow, Low Re k-ε — 3D, 2D Turbulent Flow Single-Phase Flow Creeping Flow Spf Above axisymmetric stationary with initialization time dependent with initialization Single-Phase Flow Spf Above axisymmetric time dependent Spf Turbulent Flow Turbulent Flow, Algebraic Spf Above axisymmetric time dependent Spf Spf Above axisymmetric time dependent Spf Spf Spf Spf Spf Spf Spf Spf	Turbulent Flow k-s	_	30.30	stationary			
Turbulent Flow, k-ω — 3D, 2D time dependent Turbulent Flow, SST — 3D, 2D stationary with initialization time dependent with initialization Turbulent Flow, Low Re k-ε — 3D, 2D stationary with initialization time dependent with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf axisymmetric time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	randalent How, K c		30, 20	time dependent			
Turbulent Flow, SST — 3D, 2D stationary with initialization Turbulent Flow, Low Re k-€ — 3D, 2D stationary with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf axisymmetric time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary axisymmetric time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization Stationary with initialization stationary with initialization time dependent stationary with initialization stationary time dependent stationary with initialization	Turbulent Flow k-w		30 30	stationary			
Turbulent Flow, SST — 3D, 2D time dependent with initialization Turbulent Flow, Low Re k-E — 3D, 2D stationary with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow spf axisymmetric time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization Stationary time dependent	ransalent frow, k w		30, 20	time dependent			
time dependent with initialization stationary with initialization time dependent with initialization time dependent with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf 3D, 2D, 2D stationary time dependent Viscoelastic Flow Turbulent Flow Turbulent Flow, Algebraic spf spf 3D, 2D, 2D stationary time dependent	Turbulant Flow CCT		30, 30	stationary with initialization			
Turbulent Flow, Low Re k-ε — 3D, 2D time dependent with initialization Fluid Flow Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf 3D, 2D, 2D stationary axisymmetric time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary axisymmetric time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Turbulent Flow, 551	_	3D, 2D	time dependent with initialization			
Fluid Flow Single-Phase Flow Creeping Flow Spf Spf Spf Spf Spf Spf Spf Sp	Turkulant Flaur Laur Da lea		25. 25	stationary with initialization			
Single-Phase Flow Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf 3D, 2D, 2D stationary time dependent Viscoelastic Flow yef 3D, 2D, 2D stationary time dependent Turbulent Flow axisymmetric time dependent Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Turbulent Flow, Low Re K-E	_	_	3D, 2D	time dependent with initialization		
Creeping Flow spf 3D, 2D, 2D stationary time dependent Laminar Flow¹ spf 3D, 2D, 2D stationary time dependent Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Fluid Flow						
Creeping Flow spf axisymmetric time dependent Laminar Flow¹ spf axisymmetric time dependent Viscoelastic Flow vef axisymmetric time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary time dependent Spf 3D, 2D, 2D stationary time dependent Spf 3D, 2D, 2D stationary with initialization	Single-Phase Flow						
Laminar Flow ¹ Spf axisymmetric time dependent spf 3D, 2D, 2D stationary time dependent Viscoelastic Flow Vef Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary time dependent	Crooning Flow	cnf	3D, 2D, 2D	stationary			
Laminar Flow ¹ Spf axisymmetric time dependent Viscoelastic Flow Vef Turbulent Flow Turbulent Flow Turbulent Flow, Algebraic Spf Axisymmetric time dependent Spf Spf Spf Spf Spf Spf Spf Sp	Creeping Flow	spi	axisymmetric	time dependent			
Viscoelastic Flow vef 3D, 2D, 2D stationary time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Laminar Flowi	cnf	3D, 2D, 2D	stationary			
Viscoelastic Flow vef axisymmetric time dependent Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Laminal Flow	spi	axisymmetric	time dependent			
Turbulent Flow Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	Viscoplastic Flow	vef	3D, 2D, 2D	stationary			
Turbulent Flow, Algebraic spf 3D, 2D, 2D stationary with initialization	VISCOCIASTIC FIOW	v C I	axisymmetric	time dependent			
spf	Turbulent Flow						
yPlus spt axisymmetric time dependent with initialization	Turbulent Flow, Algebraic		3D, 2D, 2D	stationary with initialization			
	yPlus	spt	axisymmetric	time dependent with initialization			

	CFD 모듈				
지배식	태그	차원	솔버		
Turkulant Flaur I VFI	t	3D, 2D, 2D	stationary with initialization		
Turbulent Flow, L-VEL	spf	axisymmetric	time dependent with initialization		
Turbulant Flaur Is a	t	3D, 2D, 2D	stationary		
Turbulent Flow, k-ε	spf	axisymmetric	time dependent		
Turbulent Flow, Realizable	cnf	3D, 2D, 2D	stationary		
k-ε	spf	axisymmetric	time dependent		
Turbulent Flow, k-ω	cnf	3D, 2D, 2D	stationary		
Turbulent Flow, κ-ω	spf	axisymmetric	time dependent		
Turbulant Flow CCT	cnf	3D, 2D, 2D	stationary with initialization		
Turbulent Flow, SST	spf	axisymmetric	time dependent with initialization		
Turbulent Flow, Low Re k-ε	cnf	3D, 2D, 2D	stationary with initialization		
Turbulent Flow, Low Re K-E	spf	axisymmetric	time dependent with initialization		
Turbulent Flow, Spalart-	cnf	3D, 2D, 2D	stationary with initialization		
Allmaras	spf	axisymmetric	time dependent with initialization		
Turbulent Flow, v2-f	spf	3D, 2D, 2D	stationary with initialization		
Tarbatene How, V2 1	3pi	axisymmetric	time dependent with initialization		
Large Eddy Simulation					
LES RBVM	spf	3D	time dependent		
LES RBVMWV	spf	3D	time dependent		
LES Smagorinsky	spf	3D	time dependent		
Detached Eddy Simulat	ion				
DES RBVM, Spalart–	spf	3D	time dependent		
Allmaras DES RBVMWV, Spalart– Allmaras	spf	3D	time dependent		
DES Smagorinsky, Spalart– Allmaras	spf	3D	time dependent		
Rotating Machinery, Fluid Flow					

CFD 모듈							
지배식	태그	차원	솔버				
Rotating Machinery,	cnf	f 3D 3D	frozen rotor				
Laminar Flow	spf	3D, 2D	time dependent				
Rotating Machinery,			frozen rotor with initialization				
Turbulent Flow, Algebraic	spf	3D, 2D	time dependent with initialization				
yPlus			time dependent with initialization				
Rotating Machinery,	cnf	3D, 2D	frozen rotor with initialization				
Turbulent Flow, L-VEL	spf	30, 20	time dependent with initialization				
Rotating Machinery,	cnf	טר טר	frozen rotor				
Turbulent Flow, k-ε	spf	3D, 2D	time dependent				
Potential Flow							
Incompressible Potential Fl	ipf	3D, 2D, 2D	stationary				
OW	iþi	axisymmetic	stationary				
Compressible Potential Flo	cpf	f all dimensions	stationary				
W	'		time dependent				
Multiphase Flow	Multiphase Flow						
Bubbly Flow							
Laminar Rubbly Flays	bf	3D, 2D, 2D	stationary				
Laminar Bubbly Flow	DI	axisymmetric	time dependent				
Bubbly Flow, Turbulent	Flow						
Bubbly Flow,	bf	3D, 2D, 2D	stationary with initialization				
Algebraic yPlus	DI	axisymmetric	time dependent with initialization				
Dubbly Flavy I V/FI	la f	3D, 2D, 2D	stationary with initialization				
Bubbly Flow, L-VEL	bf	axisymmetric	time dependent with initialization				
Dukhku Flavu ka	bf	3D, 2D, 2D	stationary				
Bubbly Flow, k-ε		axisymmetric	time dependent				
Bubbly Flow,	1.6	3D, 2D, 2D	stationary				
Realizable k-ε	bf	axisymmetric	time dependent				
Dubbly Flave to	h.f	3D, 2D, 2D	stationary				
Bubbly Flow, k-ω	bf	axisymmetric	time dependent				

	CFD 모듈					
지배식	태그	차원	솔버			
Dubbly Flow CCT	bf	3D, 2D, 2D	stationary with initialization			
Bubbly Flow, SST	DI	axisymmetric	time dependent with initialization			
Bubbly Flow,	la f	3D, 2D, 2D	stationary with initialization			
Low Re k-ε	bf	axisymmetric	time dependent with initialization			
Bubbly Flow,	bf	3D, 2D, 2D	stationary with initialization			
Spalart-Allmaras	DI	axisymmetric	time dependent with initialization			
Bulbly Flow v2 f	bf	3D, 2D, 2D	stationary with initialization			
Bubbly Flow, v2-f	DI	axisymmetric	time dependent with initialization			
Mixture Model						
Mixture Model, Laminar	mm	3D, 2D, 2D	stationary			
Flow	mm	axisymmetric	time dependent			
Mixture Model, Turbul	ent Flow	ı				
Mixture Model,		3D, 2D, 2D	stationary with initialization			
Algebraic yPlus	mm	axisymmetric	time dependent with initialization			
NA:t NA - 1 N/FI		3D, 2D, 2D	stationary with initialization			
Mixture Model, L-VEL	mm	axisymmetric	time dependent with initialization			
Ndistruma Nda dal Ita		3D, 2D, 2D	stationary			
Mixture Model, k-ε	mm	axisymmetric	time dependent			
Mixture Model,	no no	3D, 2D, 2D	stationary			
Realizable k-ε	mm	axisymmetric	time dependent			
		3D, 2D, 2D	stationary			
Mixture Model, k-ω	mm	axisymmetric	time dependent			
		3D, 2D, 2D	stationary with initialization			
Mixture Model, SST	mm	axisymmetric	time dependent with initialization			
Mixture Model,		3D, 2D, 2D	stationary with initialization			
Low Re k-ε	mm	axisymmetric	time dependent with initialization			
Mixture Model,	m :==	3D, 2D, 2D	stationary with initialization			
Spalart-Allmaras	mm	axisymmetric	time dependent with initialization			

	CFD 모듈					
지배식	태그	차원	솔버			
Minture Medal vo f		3D, 2D, 2D	stationary with initialization			
Mixture Model, v2-f	mm	axisymmetric	time dependent with initialization			
Euler-Euler Model						
Euler-Euler Model,	0.0	3D, 2D, 2D	stationary			
Laminar Flow	ee	axisymmetric	time dependent			
Euler-Euler Model,	00	3D, 2D, 2D	stationary			
Turbulent Flow	ee	axisymmetric	time dependent			
Phase Transport Mixtur	re Mode	el				
Phase Transport, Mixture		3D, 2D, 2D	stationary			
Model, Laminar Flow	_	axisymmetric	time dependent			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, Algebraic yPlus	_	axisymmetric	time dependent with initialization			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, L-VEL	_	axisymmetric	time dependent with initialization			
Phase Transport, Mixture		3D, 2D, 2D	stationary			
Model, k-ε	_	axisymmetric	time dependent			
Phase Transport, Mixture		3D, 2D, 2D	stationary			
Model, Realizable k-ε	_	axisymmetric	time dependent			
Phase Transport, Mixture		3D, 2D, 2D	stationary			
Model, k-ω	_	axisymmetric	time dependent			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, SST	_	axisymmetric	time dependent with initialization			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, Low Re k-ε	_	axisymmetric	time dependent with initialization			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, Spalart-Allmaras	_	axisymmetric	time dependent with initialization			
Phase Transport, Mixture		3D, 2D, 2D	stationary with initialization			
Model, v2-f	_	axisymmetric	time dependent with initialization			
Nonisothermal Mixture Model						

CFD 모듈					
지배식	태그	차원	솔버		
Nonisothermal Mixture		3D, 2D, 2D	stationary		
Model, Laminar Flow	_	axisymmetric	time dependent		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, Algebraic yPlus	_	axisymmetric	time dependent with initialization		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, L-VEL	_	axisymmetric	time dependent with initialization		
Nonisothermal Mixture		3D, 2D, 2D	stationary		
Model, k-ε	_	axisymmetric	time dependent		
Nonisothermal Mixture		3D, 2D, 2D	stationar		
Model, Realizable k-ε	_	axisymmetric	time dependent		
Nonisothermal Mixture		3D, 2D, 2D	stationary		
Model, k-ω	_	axisymmetric	time dependent		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, SST	_	axisymmetric	time dependent with initialization		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, Low Re k-ε	_	axisymmetric	time dependent with initialization		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, Spalart-Allmaras	_	axisymmetric	time dependent with initialization		
Nonisothermal Mixture		3D, 2D, 2D	stationary with initialization		
Model, v2-f	_	axisymmetric	time dependent with initialization		
Two-Phase Flow, Modin	ng Mesl	1			
Laminar Two-Phase Flow,		3D, 2D, 2D			
Moving Mesh	_	axisymmetric	time dependent		
Two-Phase Flow, Level	Set				
Laminar Two-Phase Flow,		3D, 2D, 2D			
Level Set		axisymmetric	time dependent with phase initialization		
Two-Phase Flow, Level Set,		3D, 2D, 2D			
Algebraic yPlus	_	axisymmetric	time dependent with initialization		
Two-Phase Flow, Level Set,	_	3D, 2D, 2D	time dependent with initialization		

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지배식	태그	차원	솔버
L-VEL		axisymmetric	
Two-Phase Flow, Level Set, k-ε	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Level Set, Realizable k-ε	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Level Set, k-ω	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Level Set, SST	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Level Set, Low Re k-ε	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Level Set, Spalart-Allmaras	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Level Set, v2-f	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Phase	Field		
Laminar Two-Phase Flow, Phase Field	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Phase Field, Algebraic yPlus	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Phase Field, L-VEL	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, Phase Field, k-ε	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Phase Field, Realizable k-ε	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Phase Field, k-ω	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Phase Field, SST	_	3D, 2D, 2D axisymmetric	time dependent with initialization

CFD 모듈					
지배식	태그	차원	솔버		
Two-Phase Flow, Phase		3D, 2D, 2D	time dependent with initialization		
Field, Low Re k-ε		axisymmetric	time dependent with initialization		
Two-Phase Flow, Phase		3D, 2D, 2D	time dependent with initialization		
Field, Spalart-Allmaras		axisymmetric	time dependent with initialization		
Two-Phase Flow, Phase		3D, 2D, 2D	time dependent with initialization		
Field, v2-f		axisymmetric	time dependent with initialization		
Two-Phase Thin-Film Flow	Phase F	Flow, Phase Field			
Two-Phase Thin-Film Flow,		3D, 2D, 2D	time descendent with phase initialization		
Phase Field		axisymmetric	time dependent with phase initialization		
Three-Phase Flow, Phase Fi	eld				
Laminar, Three-Phase Flow,		3D, 2D, 2D			
Phase Field	_	axisymmetric	time dependent with phase initialization		
Phase Transport					
Dhaca Transport	nhtr	phtr all dimensions	stationary		
Phase Transport	pnu		time dependent		
Phase Transport in Porous	phtr	phtr all dimensions	stationary		
Media	priti	all difficultions	time dependent		
Phase Transport in Free an	phtr	all dimensions	stationary		
d Porous Media Flow	рии	all difficultions	time dependent		
Porous Media and Subs	surface	Flow			
Drinkman Faustiana	بر جا	3D, 2D, 2D	stationary		
Brinkman Equations	br	axisymmetric	time dependent		
Doren's Louis	dl	all dimensions	stationary		
Darcy's Law	ai	all dimensions	time dependent		
Multiphase Flow in Porous		all dimensions	stationary		
Media		all difficults	time dependent		
Multiphase Free and Poro		3D, 2D, 2D	stationary		
us Media Flow		axisymmetric	time dependent		
Two-Phase Darcy's Law	tpdl	3D, 2D, 2D	stationary		
200 2 3 0, 0 2011	- J	axisymmetric	time dependent		

	CFD 모듈				
지배식	태그	차원	솔버		
Free and Porous Media		3D, 2D, 2D	stationary		
Flow, Brinkman	fp	axisymmetric	time dependent		
Free and Porous Media Fl		3D, 2D, 2D	stationary		
ow, Darcy		axisymmetric	time dependent		
Thin-Film and Porous Me		3D, 2D, 2D	stationary		
dia Flow	_	axisymmetric	time dependent		
		y	frequency domain		
Nonisothermal Flow					
			stationary		
Laminar Flow ^(1,2)	_	3D, 2D, 2D	time dependent		
Lammar How		axisymmetric	stationary, one-way NITF		
			time dependent, one-way NITF		
			stationary		
Brinkman Equations	_	3D, 2D, 2D	time dependent		
Diminian Equations		axissymmetric	stationary, one-way NITF		
			time dependent, one-way NITF		
			stationary		
Viscoelastic Flow	_	3D, 2D, 2D	time dependent		
		axissymmetric	stationary, one-way NITF		
			time dependent, one-way NITF		
Turbulent Flow					
			stationary with initialization		
Turbulent Flow,		3D, 2D, 2D	time dependent with initialization		
Algebraic yPlus ⁽²⁾	_	axisymmetric	stationary, one-way NITF		
			time dependent, one-way NITF		
			stationary with initialization		
Turbulent Flow, L-VEL ⁽²⁾	_	3D, 2D, 2D	time dependent with initialization		
Tarbarent How, L-VLL		axisymmetric	stationary, one-way NITF		
			time dependent, one-way NITF		
Turbulent Flow, k-ε ⁽²⁾	_	3D, 2D, 2D	stationary		

Turbulent Flow, SST** - Turbulent Flow, Low Re k-E** コープリント Turbulent Flow, Spalart-Allmaras** - Turbulent Flow, Spalart	CFD 모듈				
stationary, one-way NITF time dependent, one-way NITF time dependent stationary time dependent stationary time dependent stationary time dependent, one-way NITF time dependent stationary time dependent, one-way NITF stationary time dependent stationary time dependent stationary with initialization time dependent with initialization stationary with initialization stationary with initialization stationary with initialization stationary one-way NITF time dependent with initialization stationary with initialization stationary one-way NITF stationary with initialization stationary one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization stationary one-way NITF time dependent with initialization stationary one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF	지배식	태그	차원	솔버	
time dependent, one-way NITF stationary time dependent stationary time dependent stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary time dependent, one-way NITF time dependent stationary, one-way NITF stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent, one-way NITF time dependent, one-way NITF stationary, one-way NITF time dependent, one-way NITF stationary, one-way NITF stationary, one-way NITF stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF stationary, one-way NITF stationary, one-way NITF time dependent, one-way NITF stationary, one-way NITF stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF			axisymmetric	time dependent	
Turbulent Flow, Realizable k-ε ⁽²⁾ Turbulent Flow, k-ω ⁽²⁾ Turbulent Flow, k-ω ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbul				stationary, one-way NITF	
Turbulent Flow, Realizable k-ε ⁽²⁾ Turbulent Flow, k-ω ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbul				time dependent, one-way NITF	
Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent				stationary	
time dependent, one-way NITF stationary time dependent stationary, one-way NITF time dependent, one-way NITF stationary, one-way NITF stationary with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent with initialization time dependent with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization time dependent, one-way NITF	Turbulent Flow,		3D, 2D, 2D	time dependent	
Turbulent Flow, k-w ⁽²⁾ - 3D, 2D, 2D time dependent stationary, one-way NITF Turbulent Flow, SST ⁽²⁾ - 3D, 2D, 2D axisymmetric Turbulent Flow, Low Re k-\(\varepsilon\) - 3D, 2D, 2D axisymmetric Turbulent Flow, Low Re k-\(\varepsilon\) - 3D, 2D, 2D axisymmetric Turbulent Flow, Spalart-Allmaras ⁽²⁾ - 3D, 2D, 2D time dependent with initialization time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary, one-way NITF time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent,	Realizable k-ε ⁽²⁾		axisymmetric	stationary, one-way NITF	
Turbulent Flow, k-ω ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾				time dependent, one-way NITF	
Turbulent Flow, k-ω ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, Spalart				stationary	
axisymmetric stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization stationary with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way	Turbulent Flow k-(1)(2)		3D, 2D, 2D	time dependent	
Turbulent Flow, SST ⁽²⁾ Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, V2-f ⁽²⁾ Turb	idibalent flow, k-w	_	axisymmetric	stationary, one-way NITF	
Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, V2-f ⁽²⁾ Turbulent Flow, V2-f ⁽²⁾ Turbulent Flow, V3-f ⁽²⁾ Turbulent Flow,				time dependent, one-way NITF	
Turbulent Flow, SST ⁽²⁾ Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, N2-f ⁽²⁾				stationary with initialization	
axisymmetric stationary, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent, one-way NITF stationary with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent with initialization time depende	Turbulent Flow SST(2)		3D, 2D, 2D	time dependent with initialization	
Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v3 D time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent with initialization stationary, one-way NITF time dependent with initialization time dependent, one-way NITF	raibulent flow, 331		axisymmetric	stationary, one-way NITF	
Turbulent Flow, Low Re k-ε ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v3 D, 2D, 2D axisymmetric Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v3 D, 2D, 2D axisymmetric Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v3 D, 2D axisymmetric Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v3 D, 2D axisymmetric Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v5-f ⁽²⁾ Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v5-f ⁽²⁾ Turbulent Flow, v4-f ⁽²⁾ Turbulent Flow, v5-f ⁽²⁾ Turbulent Flow, v5-f ⁽²⁾ Turbulent Flow, v6-f ⁽²⁾ Turbulent Flow, v7-f ⁽²⁾ Turbulent Flow, v6-f ⁽²⁾ Turbulent Flow, v7-f ⁽²⁾ Turbulent Flow, v6-f ⁽²⁾ Turbulent Flow, v7-f ⁽²⁾ Turbulent Flow, v6-f ⁽²⁾ Turbul				time dependent, one-way NITF	
Low Re k-ε ⁽²⁾ axisymmetric axisymmetric time dependent, one-way NITF time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF				stationary with initialization	
time dependent, one-way NITF Stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF stationary with initialization stationary with initialization time dependent with initialization time dependent with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF	Turbulent Flow,		3D, 2D, 2D	time dependent with initialization	
Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Large Eddy Simulation Stationary with initialization stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM 3D, 2D, 2D time dependent with initialization stationary, one-way NITF time dependent, one-way NITF	Low Re k-ε ⁽²⁾		axisymmetric	stationary, one-way NITF	
Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Large Eddy Simulation Turbulent Flow, Spalart-Allmaras ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ LES RBVM Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2				time dependent, one-way NITF	
Spalart-Allmaras ⁽²⁾ axisymmetric stationary, one-way NITF time dependent, one-way NITF Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ axisymmetric stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM 3D time dependent				stationary with initialization	
time dependent, one-way NITF stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM — 3D time dependent	Turbulent Flow,		3D, 2D, 2D	time dependent with initialization	
Turbulent Flow, v2-f ⁽²⁾ Turbulent Flow, v2-f ⁽²⁾ Large Eddy Simulation LES RBVM Stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF time dependent time dependent time dependent	Spalart-Allmaras ⁽²⁾		axisymmetric	stationary, one-way NITF	
Turbulent Flow, v2-f ⁽²⁾ — 3D, 2D, 2D time dependent with initialization stationary, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM — 3D time dependent				time dependent, one-way NITF	
Turbulent Flow, v2-f ⁽²⁾ axisymmetric stationary, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM — 3D time dependent				stationary with initialization	
axisymmetric stationary, one-way NITF time dependent, one-way NITF Large Eddy Simulation LES RBVM — 3D time dependent	Turbulent Flow v2-f(2)		3D, 2D, 2D	time dependent with initialization	
Large Eddy Simulation LES RBVM — 3D time dependent	raibalent How, V2 1		axisymmetric	stationary, one-way NITF	
LES RBVM — 3D time dependent				time dependent, one-way NITF	
<u> </u>	Large Eddy Simulation				
LES RBVMWV — 3D time dependent	LES RBVM	_	3D	time dependent	
	LES RBVMWV	_	3D	time dependent	

CFD 모듈					
지배식	태그	차원	솔버		
LES Smagorinsky	_	3D	time dependent		
High Mach Number Flo	w				
High Mach Number Flow,	hmnf	3D, 2D, 2D	stationary		
Laminar	[[[[[[[[[[[[[[[[[[[[axisymmetric	time dependent		
High Mach Number Flow,	la ma m f	3D, 2D, 2D	stationary with initialization		
Algebraic yPlus	hmnf	axisymmetric	time dependent with initialization		
High Mach Number Flow,	hmnf	3D, 2D, 2D	stationary with initialization		
L–VEL	111111111	axisymmetric	time dependent with initialization		
High Mach Number Flow,	hmnf	3D, 2D, 2D	stationary with initialization		
Spalart-Allmaras	11111111	axisymmetric	time dependent with initialization		
High Mach Number Flow,	l (3D, 2D, 2D	stationary		
k-ε	hmnf	axisymmetric	time dependent		
High Mach Number Flow,	l (3D, 2D, 2D	stationary		
Realizable k-ε	hmnf	axisymmetric	time dependent		
High Mach Number Flow,	hmnf	3D, 2D, 2D	stationary		
k-ω	[11[11]]	axisymmetric	time dependent		
High Mach Number Flow,	hmnf	3D, 2D, 2D	stationary with initialization		
SST		axisymmetric	time dependent with initialization		
High Mach Number Flow,		3D, 2D, 2D	stationary with initialization		
Low Reynolds Number k-	hmnf	axisymmetric	time dependent with initialization		
ε High Mach Number Flow,		3D, 2D, 2D	stationary with initialization		
v2-f	hmnf	axisymmetric	time dependent with initialization		
Compressible Euler Equations	cee	3D, 2D	time dependent		
Rotating Machinery, Hi	gh Mac	h Number Flow			
High Mach Number Flow,		טר טר	frozen rotor		
Laminar	_	3D, 2D	time dependent		
High Mach Number Flow,		30.30	frozen rotor		
k-ε		3D, 2D	time dependent		

CFD 모듈						
지배식	태그	차원	솔버			
High Mach Number Flow,		30.30	frozen rotor with initialization			
Spalart-Allmaras		3D, 2D	time dependent with initialization			
Fluid-Structure Interact	ion					
			stationary			
Fluid-Solid Interaction,		3D, 2D, 2D	stationary, one way			
Fixed Geometry ²	_	axisymmetric	time dependent			
			time dependent, one way			
Fluid-Solid Interaction,		3D, 2D, 2D	time dependent			
Two-Phase Flow, Phase	_	axisymmetric	time dependent with phase initialization			
Field, Fixed Geometry ²		axisyiiiiietiic	time dependent with phase initialization			
			stationary			
Solid–Thin-Film Damping ²	_	3D, 2D, 2D	eigenfrequency			
John Thiri Pamping		axisymmetric	time dependent			
			frequency domain			
Thin-Film Flow						
			stationary			
Thin-Film Flow	tff	3D, 2D, 2D	time dependent			
ITIITI-FIITI FIOW	UII	axisymmetric	frequency domain			
			eigenfrequency			
			stationary			
Thin Film Flow Domain	tff	2D	time dependent			
Thin-Film Flow, Domain	ιπ	20	frequency domain			
			eigenfrequency			
Shallow Water Equation	Shallow Water Equations					
Shallow Water Equations, Time Explicit	swe	1D and 2D	time dependent			
Heat Transfer						
Heat Transfer in Fluids ¹	ht	all dimensions	stationary			
ricat iransiei iii riuius	111	all ullilensions	time dependent			

CFD 모듈				
지배식	태그	차원	솔버	
Heat Transfer in Solids and Fluids ¹	ht	all dimensions	stationary time dependent	
Conjugate Heat Transfe	er			
Laminar Flow ^(1,2)	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow				
Turbulent Flow, Algebraic yPlus ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow, L-VEL ⁽²⁾		3D, 2D, 2D axisymmetric	stationary with initialization time dependent with initialization stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow, k-ε ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow, Realizable k - $\epsilon^{(2)}$	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow, k-ω ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Turbulent Flow, SST ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization time dependent with initialization	

CFD 모듈				
지배식	태그	차원	솔버	
			stationary, one-way NITF	
			time dependent, one-way NITF	
			stationary with initialization	
Turbulent Flow, Low Re k-		3D, 2D, 2D	time dependent with initialization	
ε ⁽²⁾	_	axisymmetric	stationary, one-way NITF	
			time dependent, one-way NITF	
			stationary with initialization	
Turbulent Flow, Spalart-	_	3D, 2D, 2D	time dependent with initialization	
Allmaras ⁽²⁾	_	axisymmetric	stationary, one-way NITF	
			time dependent, one-way NITF	
			stationary with initialization	
Turbulent Flow, v2-f ⁽²⁾	_	3D, 2D, 2D	time dependent with initialization	
raibalent How, V2-1		axisymmetric	stationary, one-way NITF	
			time dependent, one-way NITF	
Heat Transfer in Porous	ht	ht all dimensions	stationary	
Media	110	all difficultions	time dependent	
Structural Mechanics				
Mathematics				
Moving Interface				
Level Set	ls	all dimensions	time dependent with phase initialization	
Level Set in Porous Media	ls	all dimensions	time dependent with phase initialization	
Dhaca Field in Fluida	t	مال مانسم معنوسم	time dependent	
Phase Field in Fluids	pf	all dimensions	time dependent with phase initialization	
Dhace Field This Files Flam	₽t+tt	3D, 2D, 2D	time dependent with phase initialization	
Phase Field Thin-Film Flow	pftff	axisymmetric	time dependent with phase initialization	
Tornany Dhace Field	tornf	3D, 2D, 2D	time dependent	
Ternary Phase Field	terpf	axisymmetric	time dependent	
Phase Field Thin-Film Flow,	pftffs	2D, 2D	time dependent with phase initialization	
Edge	Pittis	axisymmetric		

CFD 모듈					
지배식	태그	차원	솔버		
Ternary Phase Field	terpf	3D, 2D, 2D axisymmetric	time dependent		

¹ 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적인 기능들이 포함되어 있습니다.

² 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자 동적으로 적용됩니다.

³ Chemical Reaction Engineering Module이 필요합니다.

Chemical Reaction Engineering 모듈				
지배식	태그	차원	솔버	
Chemical Species Trans	port			
Transport of Diluted	1.1.	. 11 . 12	stationary	
Species ¹	tds	all dimensions	time dependent	
Transport of	4.00	all dimensions	stationary	
Concentrated Species	tcs	all dimensions	time dependent	
Chemistry	chem	all dimensions	stationary	
Chemistry	Chem	all difficults	time dependent	
Reaction Engineering	re	0D	time dependent	
Reaction Engineering	ie	00	stationary plug flow	
Nernst-Planck	nno	all dimensions	stationary	
Equations	npe	all difficults	time dependent	
			stationary	
Nernst-Planck-Poisson	tds+es	all dimensions	time dependent	
Equations	tas+es		stationary source sweep	
			small-signal analysis, frequency domain	
			stationary	
Electrophoretic	el	all dimensions	stationary with initialization	
Transport	еі	all difficults	time dependent	
			time dependent with initialization	
Transport of Diluted			stationary.	
Species in Porous	tds	all dimensions	stationary time dependent	
Media			time dependent	
Transport of			stationary.	
Concentrated Species	tcs	all dimensions	stationary time dependent	
in Porous Media			time dependent	
			stationary (3D, 2D, and 2D axisymmetric	
Surface Reactions	sr	all dimensions	models only)	
			time dependent	
Transport of Diluted	dsf	3D, 2D, 2D	stationary	
Species in Fractures	usi	axisymmetric	time dependent	
Vapor Flow				

	Chemical Reaction Engineering 모듈				
지배식	태그	차원	솔버		
Laminar Flow,		3D, 2D, 2D	stationary		
Concentrated Species	_	axisymmetric	time dependent		
Laminar Flow,		3D, 2D, 2D	stationary		
Concentrated Species,	_	axisymmetric	time dependent		
Moving Mesh		axisymmetric	time dependent		
Reacting Flow					
Laurinan Flaur		3D, 2D, 2D	stationary		
Laminar Flow	_	axisymmetric	time dependent		
Laminar Flow,		3D, 2D, 2D	stationary		
Diluted Species ¹	_	axisymmetric	time dependent		
Nonisothermal React	ting Flow				
Lawrings Flave		3D, 2D, 2D	stationary		
Laminar Flow	_	axisymmetric	time dependent		
Reacting Flow in Por	ous Medi	a			
Transport of		3D, 2D, 2D	stationary		
Diluted Species	_	axisymmetric	time dependent		
Transport of		3D, 2D, 2D	stationary		
Concentrated Species	_	axisymmetric	time dependent		
Transport of Diluted		3D, 2D, 2D	stationary		
Species, Porous Catalyst	_	axisymmetric	time dependent		
Transport of					
Concentrated Species,	_	3D, 2D, 2D	stationary		
Porous Catalyst		axisymmetric	time dependent		
Transport of		25.25.25			
Diluted Species,	_	3D, 2D, 2D	stationary		
Packed Bed		axisymmetric	time dependent		
Transport of		20, 25, 25	atation and		
Concentrated Species,	_	3D, 2D, 2D axisymmetric	stationary time dependent		
Packed Bed		anisymmetric	time dependent		

Chemical Reaction Engineering 모듈						
지배식	태그	차원	솔버			
Transport of Diluted Species, Packed Bed, Shrinking Core Model	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Dispersed Two-Phas	e Flow wi	th Species Transp	port			
Laminar Flow	_	3D, 2D	stationary time dependent			
Fluid Flow						
Single-Phase Flow						
Creeping Flow	spf	3D, 2D, 2D axisymmetric	stationary time dependent			
Laminar Flow ¹	spf	3D, 2D, 2D axisymmetric	stationary time dependent			
Porous Media and S	ubsurface	e Flow				
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent			
Darcy's Law	dl	all dimensions	stationary time dependent			
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent			
Free and Porous Media Flow, Darcy	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Nonisothermal Flow	Nonisothermal Flow					
Brinkman Equations	_	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF			
Heat Transfer						
Heat Transfer in Fluids ¹	ht	all dimensions	stationary			

Chemical Reaction Engineering 모듈				
지배식	태그	차원	솔버	
			time dependent	
Heat Transfer in Solids and Fluids ¹	ht	all dimensions	stationary time dependent	
Heat Transfer in Porous Media	ht	all dimensions	stationary time dependent	

¹ 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적인 기능들 이 포함되어 있습니다.

Corrosion 모듈				
지배식	태그	차원	솔버	
Chemical Species Transp	ort			
Transport of Diluted	4-1-	-II -I:i	stationary	
Species	tds	all dimensions	time dependent	
Chamistu.	ala a ma	all dimensions	stationary	
Chemistry	chem	all dimensions	time dependent	
			stationary	
Nernst-Planck-Poisson	tds+es	all dimensions	time dependent	
Equations	lus+es	all difficults	stationary source sweep	
			small-signal analysis, frequency domain	
			stationary	
Electrophoretic	el	all dimensions	stationary with initialization	
Transport	ei	all dimensions	time dependent	
			time dependent with initialization	
Transport of Diluted	tds	all dimensions	stationary	
Species in Porous Media	tus	all difficults	time dependent	
			stationary (3D, 2D, and 2D axisymmetric	
Surface Reactions	sr	all dimensions	models only)	
			time dependent	
Transport of Diluted	dsf	3D, 2D, 2D	stationary	
Species in Fractures	usi	axisymmetric	time dependent	
Reacting Flow				
Laminar Flow, Diluted		3D, 2D, 2D	stationary	
Species		axisymmetric	time dependent	
Electrochemistry				
			stationary	
Primary Current			stationary with initialization	
Distribution			time dependent	
	cd	all dimensions	time dependent with initialization	
Secondary Current			AC impedance, initial values	
Distribution			AC impedance, stationary	
			AC impedance, time dependent	

	Corrosion 모듈				
지배식	태그	차원	솔버		
Tertiary Current Distribution, Nernst- Planck (Electroneutrality, Water-Based with Electroneutrality, Supporting Electrolyte)	tcd	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values AC impedance, stationary AC impedance, time dependent		
Current Distribution, Boundary Element	cdbem	3D, 2D	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values AC impedance, stationary AC impedance, time dependent		
Current Distribution, Shell	cdsh	3D, 2D, 2D axisymmetric	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values AC impedance, stationary AC impedance, time dependent		
Current Distribution, Pipe	cdpipe	3D	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary AC impedance, time dependent		

	Corrosion 모듈				
지배식	태그	차원	솔버		
Electroanalysis	tcd	all dimensions	stationary time dependent AC impedance, initial values AC impedance, stationary AC impedance, time dependent cyclic voltammetry		
Electrode, Shell	els	3D, 2D, 2D axisymmetric	stationary time dependent		
Cathodic Protection	ср	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary AC impedance, time dependent		
Corrosion, Deformed	d Geomet	ry			
Corrosion, Primary Corrosion, Secondary	cd + dg	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary AC impedance, time dependent		
Corrosion, Tertiary with (Electroneutrality, Supporting Electrolyte)	tcd + dg	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values AC impedance, stationary AC impedance, time dependent		

Corrosion 모듈					
지배식	태그	차원	솔버		
Fluid Flow					
Porous Media and S	ubsurface	e Flow			
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent		
Darcy's Law	dl	all dimensions	stationary time dependent		
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent		
Free and Porous Media Flow, Darcy	_	3D, 2D, 2D axisymmetric	stationary time dependent		
Nonisothermal Flow					
Brinkman Equations	_	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF		
Heat Transfer					
Heat Transfer in Porous Media	ht	all dimensions	stationary time dependent		
Moving Interface	Moving Interface				
Level Set	ls	all dimensions	time dependent with phase initialization		
Phase Field	pf	all dimensions	time dependent time dependent with phase initialization		

Electrochemistry 모듈					
지배식	태그	차원	솔버		
Chemical Species Transport					
Transport of Diluted	tds	all dimensions	stationary		
Species	เนร	all difficults	time dependent		
Chemistry	chem	all dimensions	stationary		
Chemistry	CHCH	all difficultions	time dependent		
			stationary		
Nernst-Planck-Poisson			time dependent		
Equations	tds+es	all dimensions	stationary source sweep		
Equations			small-signal analysis		
			frequency domain		
			stationary		
Electrophoretic	-1		stationary with initialization		
Transport	el	all dimensions	time dependent		
			time dependent with initialization		
Transport of Diluted					
Species in Porous	tds	all dimensions	stationary		
Media			time dependent		
			stationary (3D, 2D, and 2D axisymmetric		
Surface Reactions	sr	all dimensions	models only)		
			time dependent		
Reacting Flow					
Laminar Flow, Diluted	_	3D, 2D, 2D	stationary		
Species		axisymmetric	time dependent		
Electrochemistry					
			stationary		
Primary Current			stationary with initialization		
Distribution			time dependent		
	cd	all dimensions	time dependentwith initialization		
Secondary Current			AC impedance, initial value		
Distribution			ACimpedance, stationary		
			AC impedance, time dependent		

Electrochemistry 모듈				
지배식	태그	차원	솔버	
Tertiary Current Distribution, Nernst- Planck (Electroneutrality, Water-Based with Electroneutrality, Supporting Electrolyte)	tcd	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary AC impedance, time dependent	
Electroanalysis	tcd	all dimensions	stationary time dependent AC impedance, initial values AC impedance, stationary AC impedance, time dependent cyclic voltammetry	
Electrode, Shell	els	3D, 2D, 2D axisymmetric	stationary time dependent	
Fluid Flow				
Porous Media and Si	ubsurface	· Flow		
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent	
Darcy's Law	dl	all dimensions	stationary time dependent	
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent	
Free and Porous Media Flow, Brinkman, Darcy		3D, 2D, 2D axisymmetric	stationary time dependent	
Nonisothermal Flow				

Electrochemistry 모듈					
지배식	태그	차원	솔버		
Brinkman Equations	l	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF		
Heat Transfer					
Heat Transfer in Porous Media	ht	all dimensions	stationary time dependent		

Fatigue 모듈				
지배식	태그	차원	솔버	
Structural Mechanics				
Fatigue ¹	£4	3D, 2D, 2D	fatigue	
Fatigue ¹ ftg		axisymmetric	stationary	
¹ Structural Mechanics Module이 필요합니다.				

Fuel Cell & Electrolyzer 모듈					
지배식	태그	차원	솔버		
Chemical Species Transp					
Transport of Diluted	tds	all dimensions	stationary		
Species	tus	all difficults	time dependent		
Transport of	tcs	all dimensions	stationary		
Concentrated Species	ics	all difficultions	time dependent		
Chemistry	chem	all dimensions	stationary		
Chemistry	CHCIII	dir dirricrisions	time dependent		
			stationary		
Nernst-Planck-Poisson	tds+es	all dimensions	time dependent		
Equations	143 1 63	dir dirricrisions	stationary source sweep		
			small-signal analysis, frequency domain		
			stationary		
Electrophoretic	el	all dimensions	stationary with initialization		
Transport	еі	all diffiensions	time dependent		
			time dependent with initialization		
Transport of Diluted	tds	s all dimensions	stationary		
Species in Porous Media		all difficultions	time dependent		
Transport of			stationary		
Concentrated Species	tcs	all dimensions	time dependent		
in Porous Media			time dependent		
			stationary		
Surface Reactions	sr	all dimensions	(3D, 2D, and 2D axisymmetric models only)		
			time dependent		
Transport of Diluted	dsf	3D, 2D, 2D	stationary		
Species in Fractures	usi	axisymmetric	time dependent		
Reacting Flow	Reacting Flow				
Lead to El		3D, 2D, 2D	stationary		
Laminar Flow	_	axisymmetric	time dependent		
Laminar Flow,		3D, 2D, 2D	stationary		
Diluted Species	_	axisymmetric	time dependent		

Fuel Cell & Electrolyzer 모듈					
지배식	태그	차원	솔버		
Nonisothermal Reacting Flow					
Laminar Flow	_	3D, 2D, 2D axisymmetric	stationary time dependent		
Reacting Flow in Por	ous Medi	a			
Transport of Diluted Species	rfds	3D, 2D, 2D axisymmetric	stationary time dependent		
Transport of Concentrated Species	rfcs	3D, 2D, 2D axisymmetric	stationary time dependent		
Electrochemistry					
Primary Current Distribution Secondary Current Distribution Tertiary Current Distribution, Nernst- Planck (Electroneutrality, Water-Based with Electroneutrality, Supporting	cd	all dimensions	stationary stationary with initialization time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary AC impedance, time dependent stationary stationary with initialization time dependent time dependent time dependentwith initialization AC impedance, initial values ACimpedance, stationary		
Electrolyte) Electroanalysis	tcd	all dimensions	stationary time dependent AC impedance, initial values AC impedance, stationary AC impedance, time dependent cyclic voltammetry		

Fuel Cell & Electrolyzer 모듈				
지배식	태그	차원	솔버	
Electrode, Shell	els	3D, 2D, 2D	stationary	
Electrode, Sriell	eis	axisymmetric	time dependent	
Hudragan Fual Call			stationary	
Hydrogen Fuel Cell Interfaces	fc	all dimensions	time dependent	
interraces			frequency domain	
Water Flactral Gor			stationary	
Water Electrolyzer Interfaces	fc	all dimensions	time dependent	
interfaces			frequency domain	
Fluid Flow				
Multiphase Flow				
Bubbly Flow				
Lauria au Dulahlu Elaur	L£	3D, 2D, 2D	stationary	
Laminar Bubbly Flow	bf	axisymmetric	time dependent	
Mixture Model				
Mixture Model,		3D, 2D, 2D	stationary	
Laminar Flow	mm	axisymmetric	time dependent	
Euler-Euler Model				
Euler-Euler Model,		3D, 2D, 2D	stationary	
Laminar Flow	ee	axisymmetric	time dependent	
Phase Transport M	ixture M	1odel		
Phase Transport,				
Mixture Model,	_	3D, 2D, 2D	stationary	
LaminarFlow		axisymmetric	time dependent	
Phase Transport				
Dhan Tour	and the state of	all diman = i = = :	stationary	
Phase Transport	phtr	all dimensions	time dependent	
DI -				
Phase Transport	phtr	all dimensions	stationary	
in Porous Media	·		time dependent	

Fuel Cell & Electrolyzer 모듈				
지배식	태그	차원	솔버	
Phase Transport in Free and Porous Media Flow	phtr	all dimensions	stationary time dependent	
Porous Media and S	ubsurfac	e Flow		
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent	
Darcy's Law	dl	all dimensions	stationary time dependent	
Multiphase Flow in Porous Media	_	all dimensions	stationary time dependent	
Multiphase Free and Porous Media Flow	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent	
Free and Porous Media Flow, Darcy	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Nonisothermal Flow				
Brinkman Equations Heat Transfer	_	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Heat Transfer in Porous Media	ht	all dimensions	stationary time dependent	

Heat Transfer 모듈						
지배식	태그	차원	솔버			
Chemical Species Transp	Chemical Species Transport					
Moisture Transport						
Moisture Transport	mt	all dimensions	stationary			
in Air	mt	all diffiensions	time dependent			
Moisture Transport	mt	all dimensions	stationary			
in Porous Media	IIIC	all difficultions	time dependent			
Moisture Transport	mt	all dimensions	stationary			
in Building Materials	1110	all difficultions	time dependent			
Moisture Flow						
Laminas Flavs(2)		all dimensions	stationary			
Laminar Flow ⁽²⁾	_	an dimensions	time dependent			
Turbulent Flow		1				
Turbulent Flow,		3D, 2D, 2D	stationary with initialization			
Algebraic yPlus ⁽²⁾	_	axisymmetric	transient with initialization			
(2)	_	3D, 2D, 2D	stationary with initialization			
Turbulent Flow, L-VEL ⁽²⁾		axisymmetric	transient with initialization			
	_	3D, 2D, 2D	stationary			
Turbulent Flow, k-ε ⁽²⁾		axisymmetric	time dependent			
(2)		3D, 2D, 2D	stationary with initialization			
Turbulent Flow, SST ⁽²⁾	_	axisymmetric	transient with initialization			
Turbulent Flow,		3D, 2D, 2D	stationary with initialization			
Low Re k-ε ⁽²⁾	_	axisymmetric	transient with initialization			
(2)		all dimensions	stationary			
Porous Media Flow ⁽²⁾	_	all dimensions	time dependent			
Fluid Flow						
Single-Phase Flow						
Laminary Fla. (1)		3D, 2D, 2D	stationary			
Laminar Flow ⁽¹⁾	spf	axisymmetric	time dependent			
Turbulent Flow		<u>-</u>				
Turbulent Flow,	spf	3D, 2D, 2D	stationary with initialization			

Heat Transfer 모듈					
지배식	태그	차원	솔버		
Algebraic yPlus		axisymmetric	transient with initialization		
Turbulent Flow, L-VEL	spf	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Turbulent Flow, k-ε	spf	3D, 2D, 2D axisymmetric	stationary time dependent		
Turbulent Flow, SST	spf	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Turbulent Flow, Low Rek-ε	spf	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Nonisothermal Flow					
Laminar Flow ^(1,2)		3D, 2D, 2D axisymmetric	stationary time dependent		
Turbulent Flow					
Turbulent Flow, Algebraic yPlus ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Turbulent Flow,		3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Turbulent Flow, SST ⁽²⁾	-	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Turbulent Flow, Low Rek-ε ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization		
Heat Transfer					
Heat Transfer in Solids ⁽¹⁾	ht	all dimensions	stationary time dependent thermal perturbation, frequency domain thermal perturbation, eigenfrequency		

	Heat Transfer 모듈				
지배식	태그	차원	솔버		
Heat Transfer in Fluids ⁽¹⁾	ht	all dimensions	stationary time dependent thermal perturbation, frequency domain thermal perturbation, eigenfrequency		
Heat Transfer in Solids and Fluids ⁽¹⁾	ht	all dimensions	stationary time dependent thermal perturbation, frequency domain thermal perturbation, eigenfrequency		
Conjugate Heat Tran	sfer				
Laminar Flow ^(1,2)	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF thermal perturbation, frequency domain		
Turbulent Flow		I			
Turbulent Flow, Algebraic yPlus ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization stationary, one-way NITF time dependent, one-way NITF		
Turbulent Flow, L-VEL ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary with initialization transient with initialization stationary, one-way NITF time dependent, one-way NITF		
Turbulent Flow, k-ε ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF		

Heat Transfer 모듈				
지배식	태그	차원	솔버	
			thermal perturbation, frequency domain	
Turbulent Flow, SST ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF thermal perturbation, frequency domain	
Turbulent Flow, Low Re k-ε	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF thermal perturbation, frequency domain	
Radiation				
Heat Transfer with Surface-to-Surface Radiation ⁽²⁾	l	all dimensions	stationary time dependent thermal perturbation, frequency domain	
Heat Transfer with Orbital Thermal Loads ⁽²⁾		3D	time dependent	
Heat Transfer with Radiation in Participating Media ⁽²⁾		3D, 2D, 2D axisymmetric	stationary time dependent thermal perturbation, frequency domain	
Heat Transfer with Radiation in Absorbing- Scattering Media ⁽²⁾	l	3D, 2D, 2D axisymmetric	stationary time dependent thermal perturbation, frequency domain	
Heat Transfer with Radiative Beam in Absorbing Media ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent thermal perturbation, frequency domain	
Surface-to-Surface Radiation	rad	all dimensions	stationary time dependent	
Orbital Thermal Loads	otl	3D	time dependent	

Heat Transfer 모듈				
지배식	태그	차원	솔버	
Radiation in	rpm	3D, 2D, 2D	stationary	
Participating Media	ТРП	axisymmetric	time dependent	
Radiation in Absorbing-	rasm	3D, 2D, 2D	stationary	
Scattering Media	103111	axisymmetric	time dependent	
Radiative Beam		3D, 2D, 2D	stationary	
in Absorbing Media	rbam	axisymmetric	time dependent	
Electromagnetic Hea	nting			
			stationary	
Joule Heating ^(1,2)	_	all dimensions	time dependent	
Joule Heating		un unnensions	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
Lumped Thermal		all dimensions	stationary	
System	lts		time dependent	
Thin Structures	I			
			stationary	
Heat Transfer	htlsh	3D, 2D, 2D	time dependent	
in Shells	nusn	axisymmetric	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Heat Transfer	la #1 a la	3D, 2D, 2D	time dependent	
in Films	htlsh	axisymmetric	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Heat Transfer in Fractures	k d d	3D, 2D, 2D	time dependent	
	htlsh	axisymmetric	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
Heat and Moisture 1	ransport			
Moist Air ⁽²⁾	_	all dimensions	stationary	
· · · · · · · · · · · · · · · · · · ·				

Heat Transfer 모듈					
지배식	태그	차원	솔버		
			time dependent		
			thermal perturbation, frequency domain		
			stationary		
Moist Porous Media ⁽²⁾	_	all dimensions	time dependent		
			thermal perturbation, frequency domain		
			stationary		
Building Materials ⁽²⁾	_	all dimensions	time dependent		
			thermal perturbation, frequency domain		
Heat and Moisture	Flow				
			stationary		
			time dependent		
		3D, 2D, 2D axisymmetric	stationary, one-way NITF		
Laminar Flow ⁽²⁾	_		time dependent, one-way NITF		
			one-way MF		
			time dependent, one-way MF		
			thermal perturbation, frequency domain		
Turbulent Flow					
			stationary with initialization		
			transient with initialization		
Turbulent Flow,	_	3D, 2D, 2D	stationary, one-way NITF		
Algebraic yPlus ⁽²⁾		axisymmetric	time dependent, one-way NITF		
			one-way MF		
			time dependent, one-way MF		
			stationary with initialization		
			transient with initialization		
Turbulent Flow,		3D, 2D, 2D	stationary, one-way NITF		
L-VEL ⁽²⁾		axisymmetric	time dependent, one-way NITF		
			one-way MF		
			time dependent, one-way MF		

	Heat Transfer 모듈			
지배식	태그	차원	솔버	
Turbulent Flow, k-ε ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF one-way MF time dependent, one-way MF thermal perturbation, frequency domain	
Turbulent Flow, SST ^(2,3)	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF one-way MF time dependent, one-way MF thermal perturbation, frequency domain	
Turbulent Flow, Low Re k-ε ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF one-way MF time dependent, one-way MF thermal perturbation, frequency domain	
Porous Media Flow ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF one-way MF time dependent, one-way MF thermal perturbation, frequency domain	
Porous Media				

Heat Transfer 모듈				
지배식	태그	차원	솔버	
			stationary	
Heat Transfer	h.	all dimensions	time dependent	
in Porous Media	ht	all dimensions	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Local Thermal	h.	all dimensions	time dependent	
Nonequilibrium	ht	all dimensions	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Heat Transfer	ht	all dimensions	time dependent	
in PackedBeds	110	all difficults	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Bioheat Transfer	ht	all dimensions	time dependent	
Bioneal Transfer	110	all dimensions	thermal perturbation, frequency domain	
			thermal perturbation, eigenfrequency	
			stationary	
Thermoelectric Effect ⁽²⁾	_	all dimensions	time dependent	
			thermal perturbation, frequency domain	

¹ 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적 인 기능들이 포함되어 있습니다.

² 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자동적으로 적용됩니다.

MEMS 모듈			
지배식	태그	차원	솔버
AC/DC			
			stationary
			stationary source sweep
Electric Currents ¹	0.0	all dimensions	frequency domain
Electric Currents	ec	all difficultions	time dependent
			small signal analysis, frequency domain
			eigenfrequency
			stationary
Electric Currents	ecis	3D	frequency domain
in Shells	ecis	30	time dependent
			eigenfrequency
			stationary
Electric Currents	ecis	3D	frequency domain
in Layered Shells	ecis	3D	time dependent
			eigenfrequency
		Netara	stationary
			frequency domain
Electrical Circuit	cir	Not space	time dependent
		dependent	small signal analysis, frequency domain
			eigenfrequency
			stationary
			time dependent
Electrostatics ¹	es	all dimensions	stationary source sweep
Licetrostatics	C3	an dirichsions	eigenfrequency
			frequency domain
			small signal analysis, frequency domain
Elastic Waves			
Elastic Waves, Time	elte	3D, 2D, 2D	time dependent
Explicit	eite	axisymmetric	time dependent
Piezoelectric Waves,		3D, 2D, 2D	time dependent
Time Explicit		axisymmetric	time dependent

	MEMS 모듈				
지배식	태그	차원	솔버		
Transport in Solids	ts	all dimensions	stationary time dependent		
Fluid Flow					
Single-Phase Flow					
Laminar Flow ¹	cof	3D, 2D, 2D	stationary		
Laminar Flow	spf	axisymmetric	time dependent		
Fluid-Structure Intera	action				
Fluid-Solid Interaction ²		3D, 2D, 2D	stationary		
Fluid-Solid Interaction	_	axisymmetric	time dependent		
Conjugate Heat		3D, 2D, 2D	stationary		
Transfer, Fluid-Solid		axisymmetric	time dependent;		
Interaction ²					
Fluid-Solid Interaction,	_	3D, 2D, 2D	time dependent		
Viscoelastic Flow ^{2,7}		axisymmetric	time dependent with phase initialization		
Fluid-Solid Interaction,		3D, 2D, 2D	time dependent		
Two-Phase Flow, Phase Field ^{2,6}	_	axisymmetric	time dependent with phase initialization		
PhaseField			stationany		
			stationary eigenfrequency		
			time dependent		
			time dependent, modal		
			time dependent, modal reduced-order		
Solid–Thin-Film		3D, 2D, 2D	model		
Damping ²	_	axisymmetric	frequency domain		
			frequency domain, modal		
			frequency domain, modal reduced-		
			order model		
			response spectrum		
			random vibration (PSD)		
Shell–Thin-Film		3D, 2D	stationary		
Damping ²	_	axisymmetric	eigenfrequency		

MEMS 모듈					
지배식	태그	차원	솔버		
			time dependent		
			time dependent, modal		
			time dependent, modal reduced-order		
			model		
			frequency domain		
			frequency domain, modal		
			frequency domain, modal reduced-		
			order model		
			response spectrum		
			random vibration (PSD)		
Thin-Film Flow					
			stationary		
	tff	3D, 2D, 2D	time dependent		
Thin-Film Flow		axisymmetric	frequency domain		
		,	eigenfrequency		
		2D	stationary		
Thin-Film Flow, Domain	tff		time dependent		
			frequency domain		
			eigenfrequency		
Electromagnetic Hea	ting				
			stationary		
12			time dependent		
Joule Heating ^{1,2}	_	all dimensions	small-signal analysis		
			frequency domain		
		3D, 2D, 2D	stationary		
Pyroelectricity	_	axisymmetric	time dependent		
	axisymmetric time dependent				
Structural Mechanics					

MEMS 모듈				
지배식	태그	차원	솔버	
Solid Mechanics ¹	solid	3D, 2D, 2D axisymmetric, 1D, 1D axisymmetric	stationary eigenfrequency eigenfrequency, prestressed mode analysis time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, modal reduced-order model frequency domain, AWE reduced-order model response spectrum random vibration (PSD) linear buckling	
Phase Field Damage ⁸	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Thermal-Structure I	nteraction			
Thermal Stress, Solid ²	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Joule Heating and Thermal Expansion ²	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Thermoelasticity ²	_	3D, 2D, 2D axisymmetric	eigenfrequency frequency domain time dependent	

MEMS 모듈				
지배식	태그	차원	솔버	
Electromechanics				
Electromechanics ²		3D, 2D, 2D axisymmetric	stationary eigenfrequency, prestressed time dependent frequency domain, prestressed	
Electromechanics, Boundary Elements ²	_	3D, 2D	stationary eigenfrequency, prestressed time dependent frequency domain, prestressed	
Piezoelectricity				
Piezoelectricity, Solid ²	_	3D, 2D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal small-signal analysis, frequency domain linear buckling	
Piezoelectricity, Layered Shell ^{2,5}	_	3D	stationary eigenfrequency time dependent frequency domain	

MEMS 모듈				
지배식	태그	차원	솔버	
			stationary	
			eigenfrequency	
			eigenfrequency, prestressed	
			time dependent	
Diama ala atmisitry and		3D, 2D, 2D	time dependent, modal	
Piezoelectricity and Pyroelectricity ²	_	axisymmetric	frequency domain	
1 yrociccurcity		axisymmetric	frequency domain, modal	
			frequency domain, prestressed	
			frequency domain, prestressed, modal	
			small-signal analysis, frequency domain	
			linear buckling	
Magnetomechanics				
			stationary	
			eigenfrequency	
		20 20 20	time dependent	
Piezomagnetism ^{2,3}	_	3D, 2D, 2D	frequency domain	
		axisymmetric	small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	
			stationary	
			eigenfrequency	
No. Page			time dependent	
Nonlinear Magnetostriction ^{2,3}	_	3D, 2D, 2D	frequency domain	
		axisymmetric	small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	

	MEMS 모듈				
지배식	태그	차원	솔버		
Magnetomechanics ^{2,3}		3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed		
Magnetomechanics, No Currents ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed		
Electrostriction Ferroelectroelasticity ²	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency domain		
Electrostriction ²	_	3D, 2D, 2D axisymmetric	stationary time dependent frequency domain		
Piezoresistivity					

	MEMS 모듈				
지배식	태그	차원	솔버		
			stationary		
			eigenfrequency		
			time dependent		
Diament in the			time dependent, modal		
Piezoresistivity, Domain Currents ²	_	3D	frequency domain		
Domaincurents			frequency domain, modal		
			small-signal analysis, frequency domain		
			eigenfrequency, prestressed		
			frequency domain, prestressed		
			stationary		
			eigenfrequency		
			time dependent		
Piezoresistivity,	_	3D	time dependent, modal		
Boundary Currents ²			frequency domain		
			frequency domain, modal		
			small-signal analysis, frequency domain		
			eigenfrequency, prestressed		
			frequency domain, prestressed		
			stationary		
			time dependent		
			time dependent, modal		
Piezoresistivity,	_	3D	frequency domain		
Shell ^{2,4}		35	frequency domain, modal		
			small-signal analysis, frequency domain		
			eigenfrequency, prestressed		
			frequency domain, prestressed		
			stationary		
Piezoresistivity,	_		time dependent		
Layered Shell ^{2,5}		3D	time dependent, modal		
20,0.00 0			frequency domain		
			frequency domain, modal		

MEMS 모듈				
지배식	태그	차원	솔버	
			small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	

- ¹ 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적인 기능들이 포함되어 있습니다.
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- ³ AC/DC Module이 필요합니다.
- ⁴ Structural Mechanics Module이 필요합니다.
- ⁵ Composite Materials Module이 필요합니다.
- ⁶ CFD Module 또는 Polymer Flow Module 또는 Microfluidics Module이 필요합니다.
- ⁷ Polymer Flow Module이 필요합니다.
- ⁸ Nonlinear Structural Materials Module이 필요합니다.

Metal Processing 모듈					
지배식	태그	차원	솔버		
Austenite Decomposition	audc	3D, 2D, 2D axisymmetric	time dependent		
Carburization	carb	3D, 2D, 2D axisymmetric, 1D, 1D axisymmetric	time dependent		
Metal Phase Transformation ¹	metp	3D, 2D, 2D axisymmetric	time dependent		
Heat Transfer with Phase Transformations ¹	ht + metp	3D, 2D, 2D axisymmetric	time dependent		
Steel Quenching ¹	ht + solid + audc	3D, 2D, 2D axisymmetric	time dependent		

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Microfluidics 모듈					
지배식	태그	차원	솔버		
Chemical Species Transp	ort				
Transport of Diluted	1.1.	. 11 . 12	stationary		
Species ¹	tds	all dimensions	time dependent		
Transport of Diluted	4-1-	-11 -1:	stationary		
Species in Porous Media	tds	all dimensions	time dependent		
Reacting Flow					
Laminar Flow,		3D, 2D, 2D	stationary		
Diluted Species ¹	_	axisymmetric	time dependent		
Fluid Flow					
Single-Phase Flow					
C	ſ	3D, 2D, 2D	stationary		
Creeping Flow	spf	axisymmetric	time dependent		
Lauria au Elauri	£	3D, 2D, 2D	stationary		
Laminar Flow ¹	spf	axisymmetric	time dependent		
Multiphase Flow					
Two-Phase Flow, M	loving N	⁄lesh			
Laminar Two-Phase		3D, 2D, 2D			
Flow, Moving Mesh	_	axisymmetric	time dependent		
Two-Phase Flow, Le	evel Set	l			
Laminar Two-Phase		3D, 2D, 2D			
Flow, Level Set	_	axisymmetric	time dependent with phase initialization		
Two-Phase Flow, Phase Field					
Laminar Two-Phase		30 30 30			
Flow, Phase Field	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization		
How, I hase Held		anisymmetric			
Three-Phase Flow,	Phase Fi	ield			
Laminar, Three-Phase		3D, 2D, 2D			
Flow, Phase Field	_	axisymmetric	time dependent with phase initialization		

		Microfluidio	cs 모듈
지배식	태그	차원	솔버
Porous Media and S	ubsurface	Flow	
D:1 5 "		3D, 2D, 2D	stationary
Brinkman Equations	br	axisymmetric	time dependent
Darcy's Law	dl	all dimensions	stationary
Darcy's Law	ui	all diffierisions	time dependent
Free and Porous	fp	3D, 2D, 2D	stationary
Media Flow, Brinkman	ıρ	axisymmetric	time dependent
Free and Porous		3D, 2D, 2D	stationary
Media Flow, Darcy		axisymmetric	time dependent
Fluid-Structure Intera	ction		
			stationary
Fluid–Solid Interaction,		3D, 2D, 2D	stationary, one way
Fixed Geometry ²	_	axisymmetric	time dependent
			time dependent, one way
Fluid-Solid Interaction,		3D, 2D, 2D	time dependent
Two-Phase Flow, Phase	_	axisymmetric	time dependent with phase initialization
Field, Fixed Geometry ²		axisyiiiiietiic	time dependent with phase initialization
Rarefied Flow	1	T	
Slip Flow	slpf	3D, 2D, 2D	stationary
	3.6.	axisymmetric	time dependent
Mathematics			
Moving Interface	T		
Level Set	ls	all dimensions	time dependent with phase initialization
Level Set in Porous Media	ls	all dimensions	time dependent with phase initialization
Phase Field in	n.f	all dimansians	time dependent
Fluids	pf	all dimensions	time dependent with phase initialization
Ternary Phase Field	terpf	3D, 2D, 2D axisymmetric	time dependent

능들이 포함되어 있습니다.

Mixer 모듈				
지배식	태그	차원	솔버	
Chemical Species Transp	ort			
Rotating Machinery,	Reacting	Flow		
Laminar Flow	_	3D, 2D,	frozen rotor	
Editinal Frew		35/ 25/	time dependent	
Turbulent Flow	T			
Turbulent Flow, k-ε	_	3D, 2D	frozen rotor	
		,	time dependent	
Turbulent Flow, k-ω	_	3D, 2D	frozen rotor	
raibalent How, k-w		30, 20	time dependent	
Turbulant Flow CCT		30 30	frozen rotor with initialization	
Turbulent Flow, SST	_	3D, 2D	time dependent with initialization	
Turbulent Flow,		30 30	frozen rotor with initialization	
Low Re k-ε		3D, 2D	time dependent with initialization	
Fluid Flow				
Single-Phase Flow				
Rotating Machiner	y, Fluid I	low		
Rotating Machinery,			frozen rotor	
Laminar Flow	spf	3D, 2D	time dependent	
Rotating Machinery,			frozen rotor with initialization	
Turbulent Flow,	spf	3D, 2D	time dependent with initialization	
Algebraic yPlus			time dependent with initialization	
Rotating Machinery,	spf	3D, 2D	frozen rotor with initialization	
Turbulent Flow, L-VEL	ЗРІ	30, 20	time dependent with initialization	
Rotating Machinery,	cnf	3D, 2D	frozen rotor	
Turbulent Flow, k-ε	spf	30, 20	time dependent	
Rotating Machinery,			frozen rotor	
Turbulent Flow,	spf	3D, 2D	time dependent	
Realizable k-ε			ame dependent	

Mixer 모듈				
지배식	태그	차원	솔버	
Rotating Machinery, Turbulent Flow, k-ω	spf	3D, 2D	frozen rotor time dependent	
Rotating Machinery, Turbulent Flow, SST	spf	3D, 2D	frozen rotor with initialization time dependent with initialization	
Rotating Machinery, Turbulent Flow, LowRe k-ε	spf	3D, 2D	frozen rotor with initialization time dependent with initialization	
Rotating Machinery, Turbulent Flow, Spalart-Allmaras	spf	3D, 2D	frozen rotor with initialization time dependent with initialization	
Rotating Machinery, Turbulent Flow, v2-f	spf	3D, 2D	frozen rotor with initialization time dependent with initialization	
Potential Flow				
Incompressible Potential Flow	lpf	3D, 2D, 2D axisymmetric	stationary	
Compressible Potential Flow	cpf	all dimensions	stationary time dependent	
Rotating Machiner	y, Mixtu	re Model		
Mixture Model, Laminar Flow	_	3D, 2D	frozen rotor time dependent	
Mixture Model, Algebraic yPlus		3D, 2D	frozen rotor with initialization time dependent with initialization	
Mixture Model, L-VEL	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Mixture Model, k-ε	_	3D, 2D	frozen rotor, time dependent	
Mixture Model, Realizable k-ε	_	3D, 2D	frozen rotor, time dependent	
Mixture Model, k-ω	_	3D, 2D	frozen rotor, time dependent	

		Mixer	모듈	
지배식	태그	차원	솔버	
Mixture Model, SST	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Mixture Model, LowRe k-ε	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Mixture Model, Spalart-Allmaras	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Mixture Model, v2-f	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Rotating Machiner	y, Phase	Transport Mix	cture Model	
Laminar Flow	_	3D, 2D	frozen rotor, time dependent	
Turbulent Flow, Algebraic yPlus	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, L-VEL	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, k-ε	_	3D, 2D	frozen rotor, time dependent	
Turbulent Flow, Realizable k-ε	_	3D, 2D	frozen rotor, time dependent	
Turbulent Flow, k-ω	_	3D, 2D	frozen rotor, time dependent	
Turbulent Flow, SST	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, LowRe k-ε	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, Spalart-Allmaras	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, v2-f	_	3D, 2D	frozen rotor with initialization time dependent with initialization	
Rotating Machinery, Two-Phase Flow, Level Set				

Mixer 모듈					
지배식	태그	차원	솔버		
Laminar Two-Phase Flow, Level Set	_	3D, 2D	time dependent with phase initialization		
Two-Phase Flow, Level Set, Algebraic yPlus	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, Level Set, L-VEL	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, Level Set, k-ε	_	3D, 2D	time dependent with phase initialization		
Two-Phase Flow, LevelSet, Realizable k-ε	_	3D, 2D	time dependent with phase initialization		
Two-Phase Flow, LevelSet, k-ω	_	3D, 2D	time dependent with phase initialization		
Two-Phase Flow, Level Set, SST	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, Level Set, Low Re k-ε	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, Level Set, Spalart-Allmaras	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, LevelSet, v2-f	_	3D, 2D	time dependent with initialization		
Rotating Machinery, Two-Phase Flow, Phase Field					
Laminar Two-Phase Flow, Phase Field	_	3D, 2D	time dependent with phase initialization		
Two-Phase Flow, Phase Field, Algebraic yPlus	_	3D, 2D	time dependent with initialization		
Two-Phase Flow, Phase Field, L-VEL	_	3D, 2D	time dependent with initialization		

Mixer 모듈				
지배식	태그	차원	솔버	
Two-Phase Flow, Phase Field, k-ε	_	3D, 2D	time dependent with phase initialization	
Two-Phase Flow, Phase Field, Realizable k-ε		3D, 2D	time dependent with phase initialization	
Two-Phase Flow, Phase Field, k-ω	_	3D, 2D	time dependent with phase initialization	
Two-Phase Flow, Phase Field, SST	_	3D, 2D	time dependent with initialization	
Two-Phase Flow, Phase Field, Low Re k-ε	_	3D, 2D	time dependent with initialization	
Two-Phase Flow, Phase Field, Spalart-Allmaras		3D, 2D	time dependent with initialization	
Two-Phase Flow, Phase Field, v2-f	_	3D, 2D	time dependent with initialization	
Rotating Machiner	y, Nonis	othermal Flow		
Laminar Flow		3D, 2D	frozen rotor time dependent	
Turbulent Flow, Algebraic yPlus		3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, L-VEL	l	3D, 2D	frozen rotor with initialization time dependent with initialization	
Turbulent Flow, k-ε	_	3D, 2D	frozen rotor time dependent	
Turbulent Flow, Realizable k-ε	_	3D, 2D	frozen rotor time dependent	

Mixer 모듈					
지배식	태그	차원	솔버		
Turbulent Flow, k-ω	_	3D, 2D	frozen rotor time dependent		
Turbulent Flow, SST	_	3D, 2D	frozen rotor with initialization time dependent with initialization		
Turbulent Flow, LowRe k-ε	_	3D, 2D	frozen rotor with initialization time dependent with initialization		
Turbulent Flow, Spalart-Allmaras	_	3D, 2D	frozen rotor with initialization time dependent with initialization		
Turbulent Flow, v2-f	_	3D, 2D	frozen rotor with initialization time dependent with initialization		
Rotating Machinery,	High Ma	ch Number Flow	,		
High Mach Number Flow, Laminar	_	3D, 2D	frozen rotor time dependent		
High Mach NumberFlow, k-ε	_	3D, 2D	frozen rotor time dependent		
High Mach Number Flow, Spalart-Allmaras	_	3D, 2D	frozen rotor with initialization time dependent with initialization		

Molecular Flow 모듈					
지배식	태그	차원	솔버		
Fluid Flow					
Rarefied Flow					
Free Molecular Flow	fmf	3D, 2D, 2D	stationary		
Free Molecular Flow	11111	axisymmetric	time dependent		
Transitional Flow	tran	3D, 2D	stationary		
			time dependent		

Fluid-Multibody Interaction, Assembly¹ Lumped Mechanical System Lumped Mechanical System Stationary Stationary Stationary Stationary Stationary Prestressed Frequency domain Frequency domain Frequency domain Frequency domain Frequency domain Frequency Stationary S	Multibody Dynamics 모듈				
Fluid-Multibody Interaction 1	지배식	태그	차원	솔버	
Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 3 Fluid-Multibody Interaction, Assembly 1 Fluid-Multibody Interaction, Assembly 1 Fluid-Multibody Interaction, Assembly 1 Fluid-Multibody Interaction, Assembly 1 Assembly 1 Assembly 1 Assembly 2 Assembly 3 Assembly 4 Assembly 6 Assembly 1 Assembly 6 Assembly 7 Assembly 7 Assembly 8 Assembly 8 Assembly 9 Assembly 9 Assembly 1 Assemb	Fluid Flow	•			
Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 1 Fluid-Multibody Interaction, Assembly 1 Lumped Mechanical System Time dependent time dependent, modal eigenfrequency, prestressed frequency domain, prestressed frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary stationary, one-way FSI time dependent time dependent, modal eigenfrequency eigenfrequency eigenfrequency eigenfrequency frequency domain frequency domain, prestressed frequency domain fr	Rarefied Flow				
Fluid-Multibody Interaction 1				stationary	
Fluid-Multibody Interaction 1 - 3D, 2D 3D, 2D Fluid-Multibody Interaction 1 Fluid-Multibody Interaction 3 Fluid-Multibody Interaction, Assembly 1 - 3D, 2D Fluid-Multibody Interaction, Assembly 1 Lumped Mechanical System - all dimensions eigenfrequency eigenfrequency, prestressed frequency domain, prestressed, modal frequency domain, prestressed, modal frequency domain, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency stationary stationary omain frequency domain frequency domain, prestressed frequency domain frequency frequenc				time dependent	
Fluid-Multibody Interaction 1				time dependent, modal	
Fluid-Multibody Interaction 1				eigenfrequency	
Interaction I frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary, one-way FSI time dependent time dependent, modal eigenfrequency domain frequency domain frequency domain frequency domain frequency domain frequency domain frequency domain, modal frequency domain, prestressed frequency domain, modal frequency domain, prestressed frequency domain, modal frequency domain frequency domain frequency domain frequency domain frequency domain frequency	Fluid Multibody			eigenfrequency, prestressed	
frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency frequency domain frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System all dimensions stationary time dependent eigenfrequency		_	3D, 2D	frequency domain	
frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain, prestressed strequency domain, prestressed frequency domain frequency fr	interaction			frequency domain, prestressed	
random vibration(PSD) response spectrum stationary stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency				frequency domain, modal	
response spectrum stationary stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System response spectrum stationary time dependent eigenfrequency				frequency domain, prestressed, modal	
stationary stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System all dimensions				random vibration(PSD)	
stationary, one-way FSI time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System stationary, one-way FSI time dependent eigenfrequency eigenfrequency eigenfrequency time dependent eigenfrequency				response spectrum	
time dependent time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System all dimensions				stationary	
time dependent, one-way FSI time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System time dependent, one-way FSI time dependent one-way				stationary, one-way FSI	
Fluid-Multibody Interaction, Assembly ¹ Lumped Mechanical System time dependent, modal eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum all dimensions time dependent, modal eigenfrequency eigenfrequency eigenfrequency eigenfrequency				time dependent	
Fluid-Multibody Interaction, Assembly ¹ Assembly ¹ Lumped Mechanical System - 3D, 2D all dimensions eigenfrequency eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, prestressed, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency				time dependent, one-way FSI	
Interaction, Assembly Assembly Interaction, Assembly Assembly Interaction, Inter				time dependent, modal	
Assembly ¹ frequency domain frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum Lumped Mechanical System all dimensions diagram-quency domain frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency	Fluid-Multibody			eigenfrequency	
frequency domain, prestressed frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency all dimensions	Interaction,	_	3D, 2D	eigenfrequency, prestressed	
frequency domain, modal frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency all dimensions	Assembly ¹			frequency domain	
frequency domain, prestressed, modal random vibration(PSD) response spectrum stationary time dependent eigenfrequency all dimensions				frequency domain, prestressed	
random vibration(PSD) response spectrum stationary time dependent eigenfrequency				frequency domain, modal	
Lumped Mechanical System response spectrum stationary time dependent eigenfrequency				frequency domain, prestressed, modal	
Lumped Mechanical System stationary time dependent eigenfrequency				random vibration(PSD)	
Lumped Mechanical System time dependent eigenfrequency				response spectrum	
Lumped — all dimensions eigenfrequency					
Lumped — all dimensions eigenfrequency Mechanical System					
Mechanical System	Lumped				
i I I	·		all dimensions		
frequency domain				irequency domain	

Multibody Dynamics 모듈					
지배식	태그	차원	솔버		
Acoustic- Structure Boundary ¹		3D, 2D, 2D axisymmetric	boundary mode analysis bolt pretension eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, modal frequency domain, modal, AWE reduced order model frequency domain, modal, reduced-order model frequency domain, mode analysis frequency domain, prestressed liner buckling random vibration (PSD) response spectrum shape optimization, frequency domain shape optimization, stationary time dependent time dependent, modal time dependent, modal time dependent, prestressed, modal topology optimization, stationary		

Multibody Dynamics 모듈				
지배식	태그	지배식	지배식	
Thermoviscous- Acoustic-Structure Boundary ¹	_	3D, 2D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed, modal random vibration response spectrum stationary time dependent time dependent, modal	

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Particle Tracing 모듈				
지배식	태그	차원	솔버	
AC/DC				
Particle Tracing				
Particle Field Interaction, Nonrelativistic	_	3D, 2D, 2D axisymmetric	bidirectionally coupled particle tracing time dependent	
Particle Field	_	3D, 2D, 2D	bidirectionally coupled particle tracing	
Interaction, Relativistic ¹		axisymmetric	time dependent	
Charged Particle	cpt	3D, 2D, 2D	bidirectionally coupled particle tracing	
Tracing	СРГ	axisymmetric	time dependent	
Fluid Flow				
Particle Tracing				
Particle Tracing	f _{in} t	3D, 2D, 2D	bidirectionally coupled particle tracing	
for Fluid Flow	fpt	axisymmetric	time dependent	
Fluid-Particle		3D, 2D, 2D	bidirectionally coupled particle tracing	
Interaction	_	axisymmetric	time dependent	
Droplet Sprays		3D, 2D, 2D	bidirectionally coupled particle tracing	
in Fluid Flow	_	axisymmetric	time dependent	
Mathematics			•	
Mathematical		3D, 2D, 2D	bidirectionally coupled particle tracing	
Particle Tracing	pt	axisymmetric	time dependent	
¹ AC/DC Module이 필요합니다.				

Pipe Flow 모듈					
지배식	태그	차원	솔버		
Acoustics					
Pipe Acoustics					
Pipe Acoustics, Frequency Domain	pafd	3D, 2D	eigenfrequency frequency domain		
Pipe Acoustics, Transient	patd	3D, 2D	time dependent		
Chemical Species Transp	ort				
Transport of Diluted Species in Pipes	dsp	3D, 2D	stationary time dependent		
Reacting Pipe Flow	rpfl	3D, 2D	stationary time dependent		
Fluid Flow			,		
Single-Phase Flow					
Pipe Flow	pfl	3D, 2D	stationary time dependent		
Water Hammer	whtd	3D, 2D	time dependent		
Nonisothermal Flow					
Nonisothermal Pipe Flow	nipfl	3D, 2D	stationary time dependent		
Fluid–Pipe Interaction, Fixed Geometry ²	_	3D, 2D	stationary time dependent		
Heat Transfer	Heat Transfer				
Heat Transfer in Pipes	htp	3D, 2D	stationary time dependent		
Structural Mechanics					

	Pipe Flow 모듈					
지배식	태그	차원	솔버			
Pipe Mechanics	pipem	3D, 2D	eigenfrequency time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, modal reduced-order model time dependent response spectrum random vibration (PSD)			

Plasma 모듈					
지배식	태그	차원	솔버		
AC/DC					
			stationary		
		Not space	frequency domain		
Electrical Circuit	cir	Not space	time dependent		
		dependent	small signal analysis, frequency domain		
			eigenfrequency		
			stationary		
Electrostatics ¹	es	all dimensions	time dependent		
			stationary source sweep		
Fluid Flow					
Single-Phase Flow					
	spf	3D, 2D, 2D	stationary		
Laminar Flow ¹		axisymmetric	time dependent		
Plasma					
Boltzmann Equation,			mean energies		
Two-Term	be	0D	reduced electric fields		
Approximation			time dependent		
Diagram Times Devicedia		1D, 2D	time periodic		
Plasma, Time Periodic	ptp	axisymmetric	time periodicto time dependent		
			time dependent		
Plasma	plas	all dimensions	stationary		
Inductively Coupled		3D, 2D, 2D	frequency-transient		
Plasma ^{2,4}	_	axisymmetric	frequency-stationary		
Inductively Coupled		2D, 2D	frequency-time periodic		
Plasma with RF Bias ^{2,4}	_	axisymmetric	time periodic to time dependent		
Microwave Plasma ^{3,4}	_	3D, 2D, 2D axisymmetric	frequency-transient		
Electric Discharges					

Plasma 모듈						
지배식	태그	차원	솔버			
Corona Discharge ⁴	_	all dimensions	stationary			
Electrical Breakdown Detection	ebd	3D, 2D, 2D axisymmetric	time dependent			
Equilibrium Discharg	es					
Equilibrium Discharges, Out-of- Plane Currents ^{2,4}	_	2D, 2D axisymmetric	stationary time dependent frequency-transient frequency-stationary			
Equilibrium Discharges, In- Plane Currents ^{2,4}	_	2D, 2D axisymmetric	stationary time dependent frequency-transient frequency-stationary			
Equilibrium Discharges ^{2,4}	_	3D	stationary time dependent frequency-transient frequency-stationary			
Species Transport	Species Transport					
Drift Diffusion	dd	all dimensions	time dependent			
Heavy Species Transport	hs	all dimensions	time dependent			
Charge Transport	ct	all dimensions	stationary			

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² AC/DC Module이 필요합니다.

³ RF Module이 필요합니다.

⁴ 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자동적으로 적용됩니다.

Polymer Flow 모듈					
지배식	태그	차원	솔버		
Chemical Species Transport					
Transport of	+dc	n 12 ·	stationary		
Diluted Species ¹	tds	all dimensions	time dependent		
Reacting Flow					
Laminar Flow,		3D, 2D, 2D	stationary		
Diluted Species ¹	_	axisymmetric	time dependent		
Fluid Flow					
Single-Phase Flow					
C		3D, 2D, 2D	stationary		
Creeping Flow	spf	axisymmetric	time dependent		
Laminar Flaur	a.a.f	3D, 2D, 2D	stationary		
Laminar Flow	spf	axisymmetric	time dependent		
Viscoelastic Flow	vef	3D, 2D, 2D	stationary		
VISCOEIASTIC FIOW	vei	axisymmetric	time dependent		
Rotating Machiner	y, Fluid I	Flow			
Rotating Machinery,			frozen rotor		
Laminar Flow	spf	3D, 2D	time dependent		
			Time dependent		
Potential Flow					
Incompressible		3D, 2D, 2D			
Potential Flow	ipf	axisymmetric	stationary		
Multiphase Flow					
<u> </u>					
Two-Phase Flow, M	ioving N	riesn			
Laminar Two-Phase		3D, 2D, 2D			
Flow, Moving Mesh	_	axisymmetric	time dependent		
Two-Phase Flow, Level Set					

Polymer Flow 모듈			
지배식	태그	차원	솔버
Laminar Two-Phase Flow, Level Set	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Two-Phase Flow, Level Set, Brinkman Equations	_	3D, 2D, 2D axisymmetric	time dependent with initialization
Two-Phase Flow, P	hase Fiel	d	
Laminar Two-Phase Flow, Phase Field	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Three-Phase Flow,	Phase Fi	eld	
Laminar, Three-Phase Flow, Phase Field	_	3D, 2D, 2D axisymmetric	time dependent with phase initialization
Porous Media and Su	ubsurface	Flow	
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent
Nonisothermal Flow			
Laminar Flow ⁽²⁾	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF
Viscoelastic Flow	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF

Polymer Flow 모듈						
지배식	태그	차원	솔버			
Fluid-Structure Intera	Fluid-Structure Interaction					
Fluid-Solid Interaction, Fixed Geometry ²	_	3D, 2D, 2D axisymmetric	stationary stationary, one way time dependent time dependent, one way			
Fluid-Solid Interaction, Viscoelastic Flow, Fixed Geometry ²	_	3D, 2D, 2D axisymmetric	time dependent time dependent with phase initialization			
Fluid-Solid Interaction, Two-Phase Flow, Phase Field, Fixed Geometry ²	_	3D, 2D, 2D axisymmetric	time dependent time dependent with phase initialization			
Heat Transfer						
Heat Transfer in Fluids ¹	ht	all dimensions	stationary time dependent			
Heat Transfer in Solids and Fluids ¹	ht	all dimensions	stationary time dependent			
Curing						
Curing Reaction	creq	3D, 2D, 2D axisymmetric, 1D	stationary time dependent			
Moving Interface	Moving Interface					
Level Set	ls	all dimensions	time dependent with phase initialization			
Level Set in Porous Media	ls	all dimensions	time dependent with phase initialization			
Phase Field in Fluids	pf	all dimensions	time dependent			

Polymer Flow 모듈				
지배식	태그	차원	솔버	
			time dependent with phase initialization	
Ternary Phase Field	terpf	3D, 2D, 2D axisymmetric	time dependent	

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Porous Media Flow 모듈						
지배식	태그	차원	솔버			
Chemical Species Transp	Chemical Species Transport					
Transport of Diluted Species ¹	tds	all dimensions	stationary time dependent			
Transport of Diluted Species in Porous Media	tds	all dimensions	stationary time dependent			
Transport of Diluted Species in Fractures	dsf	3D, 2D, 2D axisymmetric	stationary time dependent			
Moisture Transport						
Moisture Transport in Air	mt	all dimensions	stationary time dependent			
Moisture Transport in Porous Media	mt	all dimensions	stationary time dependent			
Moisture Transport in Building Materials	mt	all dimensions	stationary time dependent			
Moisture Transport in Solids	mts	all dimensions	stationary time dependent			
Moisture Flow						
Laminar Flow	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way Moisture Flow time dependent, one-way Moisture Flow			
Porous Media Flow	_	3D, 2D, 2D axisymmetric	stationary time dependent stationary, one-way Moisture Flow time dependent, one-way Moisture Flow			
Reacting Flow						
Laminar Flow, Diluted Species ¹	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Reacting Flow in Porous Media						

Porous Media Flow 모듈				
지배식	태그	차원	솔버	
Transport of		3D, 2D, 2D	stationary	
Diluted Species		axisymmetric	time dependent	
Fluid Flow				
Single-Phase Flow		<u> </u>		
Creeping Flow	spf	3D, 2D, 2D	stationary	
Creeping Flow	3þ1	axisymmetric	time dependent	
Laminar Flow	spf	3D, 2D, 2D	stationary	
Laminar How	spi	axisymmetric	time dependent	
Multiphase Flow				
Two-Phase Flow, I	Level Set	t		
Two-Phase Flow,		3D, 2D, 2D		
Level Set,	_	axisymmetric	time dependent with initialization	
Brinkman Equations		<i>a.</i>		
Phase Transport				
Phase Transport	phtr	all dimensions	stationary	
Thase Hansport	Pritti		time dependent	
Phase Transport	phtr	all dimensions	stationary	
in Porous Media	pritt	all difficusions	time dependent	
Phase Transport in			stationary	
Free and Porous	phtr	all dimensions	time dependent	
Media Flow			time dependent	
Porous Media and Su	ıbsurface	Flow		
Brinkman Equations	br	3D, 2D, 2D	stationary	
211111111111111111111111111111111111111		axisymmetric	time dependent	
Darcy's Law	dl	all dimensions	stationary	
Dailey 5 Law	Gi	dir dirricrisions	time dependent	
Layered	ldl	3D	stationary	
Darcy's Law	101		time dependent	
Fracture Flow	esff	3D, 2D, 2D	stationary	
riacture flow	6211	axisymmetric	time dependent	

Porous Media Flow 모듈				
지배식	태그	차원	솔버	
Richards' Equation	dl	all dimensions	stationary time dependent	
Multiphase Flow in Porous Media	_	all dimensions	stationary time dependent	
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent	
Free and Porous Media Flow, Darcy	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Nonisothermal Flow				
Brinkman Equations	_	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF	
Heat Transfer				
Heat Transfer in Solids	ht	all dimensions	stationary time dependent	
Heat Transfer in Fluids ¹	ht	all dimensions	stationary time dependent	
Heat Transfer in Solids and Fluids ¹	ht	all dimensions	stationary time dependent	
Thin Structures				
Heat Transfer in Fractures	htlsh	3D, 2D, 2D axisymmetric	stationary time dependent thermal perturbation, frequency domain	
Heat and Moisture Tra	Heat and Moisture Transport			

Porous Media Flow 모듈					
지배식	태그	차원	솔버		
			stationary		
Moist Air	_	all dimensions	time dependent		
			thermal perturbation, frequency domain		
			stationary		
Moist Porous Media	_	all dimensions	time dependent		
			thermal perturbation, frequency domain		
			stationary		
Building Materials	_	all dimensions	time dependent		
			thermal perturbation, frequency domain		
Heat and Moisture	Flow				
			stationary		
		3D, 2D, 2D	time dependent		
Laminar Flow	_	axisymmetric	stationary, one-way Moisture Flow		
			time dependent, one-way Moisture Flow		
			stationary		
D 14 1: 51		3D, 2D, 2D	time dependent		
Porous Media Flow	_	axisymmetric	stationary, one-way Moisture Flow		
			time dependent, one-way Moisture Flow		
Porous Media					
Heat Transfer			stationary		
in Porous Media	ht	all dimensions	time dependent		
			stationary		
Local Thermal	ht	all dimensions	time dependent		
Nonequilibrium			thermal perturbation, frequency domain		
_			stationary		
Heat Transfer	ht	all dimensions	time dependent		
in Packed Beds			thermal perturbation, frequency domain		
Structural Mechanics	Structural Mechanics				
Poroelasticity					

	Porous Media Flow 모듈					
지배식	태그	차원	솔버			
Poroelasticity, Solid ²	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Poroelasticity, Large Deformation, Solid ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Poroelasticity, Layered Shell ^{2,4}	_	3D	stationary time dependent			
Unsaturated Poroelasticity ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Mathematics	Mathematics					
Level Set	ls	all dimensions	time dependent with phase initialization			
Level Set in Porous Media	ls	all dimensions	time dependent with phase initialization			

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³ Structural Mechanics Module이 필요합니다.

⁴ Composite Materials Module 및 Structural Mechanics Module이 필요합니다

Ray Optics 모듈				
지배식	태그	차원	솔버	
Optics				
Ray Optics				
Geometrical Optics	gop	3D, 2D, 2D axisymmetric	ray tracing bidirectionally coupled ray tracing time dependent	
Ray Heating	_	3D, 2D, 2D axisymmetric	ray tracing bidirectionally coupled ray tracing time dependent	

RF 모듈					
지배식	태그	차원	솔버		
AC/DC					
			stationary		
		Net	frequency domain		
Electrical Circuit	cir	Not space dependent	time dependent		
		аерепает	small signal analysis, frequency domain		
			eigenfrequency		
Heat Transfer					
Electromagnetic Hea	ting				
			frequency-stationary		
			frequency-transient		
Microwave Heating ¹	_	3D, 2D, 2D axisymmetric	frequency-stationary, one-way		
g			electromagnetic heating		
			frequency-transient, one-way electromagnetic		
			heating		
Radio Frequency					
Electromagnetic Waves, Asymptotic Scattering	ewas	3D, 2D	frequency domain		
Electromagnetic Waves, Boundary Elements	embe	3D, 2D	frequency domain		
			adaptive frequency sweep		
			boundary mode analysis		
			eigenfrequency		
			frequency domain		
Electromagnetic Waves,		3D, 2D, 2D	frequency domain, modal		
Frequency Domain	emw	axisymmetric	frequency domain, RF adaptive mesh		
			frequency domain source sweep		
			mode analysis (2D and 2D axisymmetric		
			models only)		
			TEM boundary mode analysis		

RF 모듈					
지배식	태그	차원	솔버		
Electromagnetic Waves, Time Explicit	ewte	3D, 2D, 2D axisymmetric	time dependent timedependent with FFT		
Electromagnetic Waves, Transient	temw	3D, 2D, 2D axisymmetric	eigenfrequency time dependent time dependent, modal time dependent with FFT		
Transmission Line	tl	3D, 2D, 1D	eigenfrequency frequency domain		
Electromagnetic Waves, FEM-BEM		3D, 2D	frequency domain		

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	Semiconductor 모듈					
지배식	태그	차원	솔버			
AC/DC	AC/DC					
			stationary			
		Not space	frequency domain			
Electrical Circuit	cir	dependent	time dependent			
		иерепиет	small signal analysis, frequency domain			
			eigenfrequency			
			stationary			
			time dependent			
Electrostatics ¹	0.5	all dimensions	stationary source sweep			
Electrostatics	es	all difficults	eigenfrequency			
			frequency domain			
			small signal analysis, frequency domain			
Semiconductor						
	semi	all dimensions	small-signal analysis, frequency domain			
			stationary			
Semiconductor			time dependent			
			semiconductor equilibrium			
Semiconductor			frequency-stationary			
Optoelectronics,	_	3D, 2D, 2D	frequency-transient			
Beam Envelopes ²		axisymmetric	small-signal analysis, frequency domain			
Semiconductor		3D, 2D, 2D	frequency-stationary			
Optoelectronics,	_	axisymmetric	frequency-transient			
Frequency Domain ²			small-signal analysis, frequency domain			
			eigenvalue			
Schrödinger Equation	schr	all dimensions	stationary			
			time dependent			
Calcuit dia acci Delega						
Schrödinger-Poisson Equation	_	all dimensions	Schrödinger-Poisson			
Equation						

Semiconductor 모듈					
지배식	태그	차원	솔버		

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² Wave Optics Module 및 Semiconductor Module이 필요합니다.

Structural Mechanics 모듈						
지배식	태그	차원	솔버			
Acoustics	Acoustics					
Elastic Waves						
Elastic Waves,	elte	3D, 2D, 2D	time dependent			
Time Explicit	eile	axisymmetric	time dependent			
Piezoelectric Waves,		3D, 2D, 2D	time dependent			
Time Explicit		axisymmetric	time dependent			
Chemical Species Tr	ansport					
Transport in Solids	ts	all dimensions	stationary			
mansport in solids	ıs	all difficultions	time dependent			
Fluid Flow						
Fluid-Structure Intera	action					
	_	3D, 2D, 2D	stationary			
Fluid-Solid Interaction ²		axisymmetric	time dependent			
		3D, 2D	stationary			
Fluid-Shell Interaction ²	_	axisymmetric	time dependent			
			stationary			
Fluid-Shell Interaction,		3D, 2D	stationary, one way			
Fixed Geometry	_	axisymmetric	time dependent			
			time dependent, one way			
Fluid-Membrane		3D, 2D	stationary			
Interaction ²	_	axisymmetric	time dependent			
Fluid-Membrane			stationary			
Interaction, Fixed		3D, 2D	stationary, one way			
	_	axisymmetric	time dependent			
Geometry ²			time dependent, one way			
Fluid-Pipe Interaction,		25.25	stationary			
Fixed Geometry ^{2,7}	_	3D, 2D	time dependent			

	Structural Mechanics 모듈				
지배식	태그	차원	솔버		
Conjugate Heat Transfer, Fluid-Solid Interaction ²	_	3D, 2D, 2D axisymmetric	stationary time dependent		
Fluid–Solid Interaction, Viscoelastic Flow ^{2,10}	_	3D, 2D, 2D axisymmetric	time dependent time dependent with phase initialization		
Fluid-Solid Interaction, Two-Phase Flow, Phase Field ^{2,6}	_	3D, 2D, 2D axisymmetric	time dependent time dependent with phase initialization		
Solid–Thin-Film Damping²	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, modal frequency domain, modal reduced-order model response spectrum random vibration (PSD)		
Shell–Thin-Film Damping²	_	3D, 2D axisymmetric	stationary eigenfrequency time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, modal frequency domain, modal reduced-order model response spectrum random vibration (PSD)		

Structural Mechanics 모듈					
지배식	태그	차원	솔버		
Structural Mechanics					
Solid Mechanics ¹	solid	3D, 2D, 2D axisymmetric 1D, 1D axisymmetric	stationary eigenfrequency eigenfrequency, prestressed mode analysis time dependent time dependent, modal time dependent, modal reduced-order model frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, modal reduced-order model frequency domain, AWE reduced-order model frequency domain, AWE reduced-order model response spectrum random vibration (PSD) linear buckling bolt pretension		

		Structural Mec	hanics 모듈
지배식	태그	차원	솔버
Shell	shell	3D, 2D axisymmetric	eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed, modal frequency domain, modal reduced-order model response spectrum random vibration (PSD) linear buckling
Plate	plate	2D	stationary eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, modal reduced-order model response spectrum random vibration (PSD) linear buckling

Structural Mechanics 모듈				
지배식	태그	차원	솔버	
Beam	beam	3D, 2D	stationary eigenfrequency time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, modal reduced-order model time dependent response spectrum random vibration (PSD)	
Beam Cross Section	bcs	3D, 2D	linear buckling stationary	
Truss	truss	3D, 2D	stationary eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, modal reduced-order model response spectrum random vibration (PSD) linear buckling	

		Structural Mec	hanics 모듈
지배식	태그	차원	솔버
Wire	wire	3D, 2D	stationary eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal frequency domain, modal reduced-order model response spectrum random vibration (PSD) linear buckling
Membrane	mbrn	3D, 2D axisymmetric	stationary eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal time dependent, modal reduced-order model frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed, modal frequency domain, modal reduced-order model response spectrum randomvibration (PSD)

Structural Mechanics 모듈				
지배식	태그	차원	솔버	
	ninom		stationary eigenfrequency time dependent, modal time dependent, modal reduced-order model frequency domain	
Pipe Mechanics	pipem	3D, 2D	frequency domain, modal frequency domain, modal reduced-order model time dependent response spectrum random vibration (PSD)	
Phase Field Damage ^{2,11}	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Thermal–Structure II	 nteraction		Time dependent	
Thermal Stress, Solid ²	_	3D, 2D, 2D axisymmetric	stationary time dependent	
Thermal Stress, Shell ^{2,4}	_	3D, 2D axisymmetric	stationary time dependent	
Thermal Stress, Membrane ^{2,4}	_	3D, 2D axisymmetric	stationary time dependent	

	Structural Mechanics 모듈				
지배식	태그	차원	솔버		
Joule Heating and Thermal Expansion ²	_	3D, 2D, 2D axisymmetric	stationary time dependent		
Piezoelectricity					
Piezoelectricity, Solid ²	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency eigenfrequency, prestressed time dependent time dependent, modal frequency domain frequency domain, modal frequency domain, prestressed frequency domain, prestressed frequency domain, prestressed, modal small-signal analysis, frequency domain linear buckling		
Piezoelectricity, Layered Shell ^{2,5}	_	3D	stationary eigenfrequency time dependent frequency domain		
Magnetomechanics					
Piezomagnetism ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent frequency domain small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed		
Nonlinear Magnetostriction ^{2,3}	_	3D, 2D, 2D axisymmetric	stationary eigenfrequency time dependent		

Structural Mechanics 모듈				
지배식	태그	차원	솔버	
			frequency domain	
			small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	
			stationary	
			eigenfrequency	
		20.20.20	time dependent	
Magnetomechanics ^{2,3}	_	3D, 2D, 2D	frequency domain	
		axisymmetric	small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	
		3D, 2D, 2D axisymmetric	stationary	
	_		eigenfrequency	
Magnetemechanics			time dependent	
Magnetomechanics,			frequency domain	
No Currents ^{2,3}			small-signal analysis, frequency domain	
			eigenfrequency, prestressed	
			frequency domain, prestressed	
Magnetic–Elastic			stationary	
Interaction in Rotating	_	3D, 2D	time dependent	
Machinery ^{2,3}			frequency domain	
Electrostriction				
			stationary	
Ferroelectroelasticity ^{2,9}	_	3D, 2D, 2D	time dependent	
		axisymmetric	frequency domain	
			stationary	
Electrostriction ^{2,9}	_	3D, 2D, 2D	time dependent	
		axisymmetric	frequency domain	
Piezoresistivity				

Structural Mechanics 모듈						
지배식	태그	차원	솔버			
			stationary time dependent time dependent, modal			
Piezoresistivity, Shell ^{2,12}	l	3D	frequency domain frequency domain, modal small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed			
Piezoresistivity, Layered Shell ^{2,5,12}	_	3D	stationary time dependent time dependent, modal frequency domain frequency domain, modal small-signal analysis, frequency domain eigenfrequency, prestressed frequency domain, prestressed			
Poroelasticity		I				
Poroelasticity, Large Deformation, Solid ^{2,8}	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Unsaturated Poroelasticity ^{2,8}	_	3D, 2D, 2D axisymmetric	stationary time dependent			
Mathematics						
Moving Interface	Moving Interface					
Phase Field in Solids	pfs	3D, 2D, 2D axisymmetric	stationary time dependent			

Structural Mechanics 모듈				
지배식	태그	차원	솔버	

- 1 이 지배식들은 COMSOL Multiphysics 플랫폼에 포함되어 있습니다. 다만 해당 모듈안에 추가적인 기능들이 포함되어 있습니다.
- 2 이 지배식들은 미리 정의된 Multiphysics 노드입니다. 해당 노드를 추가하면 각 분야의 필요한 지배식들이 자동적으로 적용됩니다.
- 3 AC/DC Module이 필요합니다.
- 4 Heat Transfer Module이 필요합니다.
- 5 Composite Materials Module이 필요합니다.
- 6 CFD Module, Polymer Flow, 또는 Microfluidics Module이 필요합니다.
- 7 Pipe Flow Module이 필요합니다.
- 8 Porous Media Flow Module이 필요합니다.
- 9 AC/DC Module 또는 MEMS Module이 필요합니다.
- 10 Polymer Flow Module이 필요합니다.
- 11 Nonlinear Structural Materials Module 혹은 Geomechanics Module이 필요합니다.
- 12 MEMS Module이 필요합니다.

Subsurface Flow 모듈							
지배식	태그	차원	솔버				
Chemical Species Transport							
Transport of Diluted Species ¹	tds	all dimensions	stationary time dependent				
Transport of Diluted Species in Porous Media	tds	all dimensions	stationary time dependent				
Transport of Diluted Species in Fractures	dsf	3D, 2D, 2D axisymmetric	stationary time dependent				
Reacting Flow							
Laminar Flow, Diluted Species ¹	_	3D, 2D, 2D axisymmetric	stationary time dependent				
Reacting Flow in Por	ous Med	ia					
Transport of Diluted Species	_	3D, 2D, 2D axisymmetric	stationary time dependent				
Fluid Flow							
Single-Phase Flow							
Creeping Flow	spf	3D, 2D, 2D axisymmetric	stationary time dependent				
Laminar Flow ¹	spf	3D, 2D, 2D axisymmetric	stationary time dependent				
Multiphase Flow							
Phase Transport							
Phase Transport	phtr	all dimensions	stationary time dependent				
Phase Transport in Porous Media	phtr	all dimensions	stationary time dependent				

	Subsurface Flow 모듈				
지배식	태그	차원	솔버		
Phase Transport in Free and Porous Media Flow	phtr	all dimensions	stationary time dependent		
Porous Media and Su	ubsurface	Flow			
Brinkman Equations	br	3D, 2D, 2D axisymmetric	stationary time dependent		
Darcy's Law	dl	all dimensions	stationary time dependent		
Fracture Flow	ff	3D, 2D, 2D axisymmetric	stationary time dependent		
Richards' Equation	dl	all dimensions	stationary time dependent		
Multiphase Flow in Porous Media		all dimensions	stationary time dependent		
Two-Phase Darcy's Law	tpdl	3D, 2D, 2D axisymmetric	stationary time dependent		
Free and Porous Media Flow, Brinkman	fp	3D, 2D, 2D axisymmetric	stationary time dependent		
Free and Porous Media Flow, Darcy	l	3D, 2D, 2D axisymmetric	stationary time dependent		
Nonisothermal Flow					
Brinkman Equations	_	3D, 2D, 2D axissymmetric	stationary time dependent stationary, one-way NITF time dependent, one-way NITF		

Subsurface Flow 모듈						
지배식	태그	차원	솔버			
Shallow Water Equat	Shallow Water Equations					
Shallow Water Equations, Time Explicit	swe	1D and 2D	time dependent			
Heat Transfer						
Heat Transfer in Solids	ht	all dimensions	stationary time dependent			
Heat Transfer in Fluids ¹	ht	all dimensions	stationary time dependent			
Heat Transfer in Solids and Fluids ¹	ht	all dimensions	stationary time dependent			
Heat Transfer in Fractures	htlsh	3D, 2D, 2D axisymmetric	stationary time dependent thermal perturbation, frequency domain			
Heat Transfer in Porous Media	ht	all dimensions	stationary time dependent			
Structural Mechanics						
Poroelasticity						
Poroelasticity, Solid ²	_	3D, 2D, 2D axisymmetric	stationary time dependent			
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기능들이 포함이 되어 있습니다.

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	Wave Optics 모듈						
지배식	태그	차원	솔버				
Heat Transfer							
Electromagnetic Hea	Electromagnetic Heating						
			frequency-stationary				
			frequency-transient				
Laser Heating ¹		3D, 2D, 2D	frequency-stationary, one-way				
Laser Heating	_	axisymmetric	electromagnetic heating				
			frequency-transient, one-way electromagnetic				
			heating				
Optics							
Wave Optics							
•	<u> </u>						
	ewbe	3D, 2D, 2D axisymmetric	adaptive frequency sweep				
			boundary mode analysis				
Electromagnetic			eigenfrequency				
Waves, Beam			frequency domain				
Envelopes			frequency domain, modal				
			wavelength domain				
			frequency domain source sweep				
Electromagnetic Waves,	ebem	3D, 2D	frequency domain				
Boundary Elements			wavelength domain				
			adaptive frequency sweep				
			boundary mode analysis				
			eigenfrequency				
Electromagnetic Waves,		3D, 2D, 2D	frequency domain				
Frequency Domain	ewfd	axisymmetric	frequency domain, modal				
, ,			mode analysis (2D and 2D axisymmetric				
			models only)				
			wavelength domain				
			frequency domain source sweep				
Electromagnetic	40	3D, 2D, 2D	time dependent				
Waves, Time Explicit	teew	axisymmetric	time dependent with FFT				

Wave Optics 모듈				
지배식	태그	차원	솔버	
Electromagnetic Waves, Transient	ewt	3D, 2D, 2D axisymmetric	eigenfrequency time dependent time dependent, modal, time dependent with FFT	
Electromagnetic Waves, FEM-BEM ¹		3D, 2D	frequency domain wavelength domain	

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